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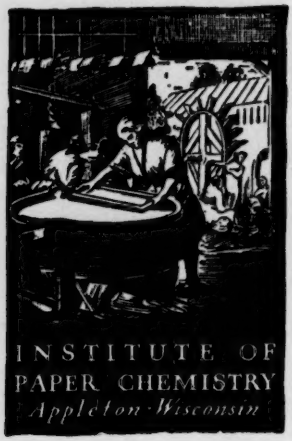
BULLETIN

OF

THE INSTITUTE OF PAPER CHEMISTRY



AFFILIATED WITH

LAWRENCE COLLEGE

APPLETON, WISCONSIN

LIBRARY NOTES

APRIL · 1949

Volume 19 Number 8

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Books and Pamphlets Added to the Library During March

AMPLIFIERS, VACUUM TUBE

BODE, HENDRIK W. Network analysis and feedback amplifier design. New York, Van Nostrand [c1945; 4th printing 1947] 551 p.

BIOLOGICAL CHEMISTRY

MINNESOTA UNIVERSITY. *Division of Agricultural Biochemistry.* Collected research papers, numbers 769-789. Volume 14, 1946-1947. St. Paul, Minnesota Agricultural Experiment Station, 1948. Reprints with various pagings.

BIOLOGY

LAGLER, KARL F. Studies in freshwater fishery biology. 3d rev. ed. Ann Arbor, Mich., J. W. Edwards, 1949. 231 p.

COLLOIDS

WEISER, HARRY BOYER. A textbook of colloid chemistry. 2d ed. New York, Wiley [c1949] 444 p.

CONTAINERS

STERN, WALTER. The package engineering handbook. Published originally in Fibre Containers 1946-1948. Rev. ed. Chicago, Board Products Publ. Co., c1949. 175 p.

FOREST PRODUCTS

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS. 1948 yearbook of forest products statistics. Washington, The Organization, 1949. 205 p.

SUOMEN punn tie metsästä maailmalle. Finland's wealth of wood. Tekstiosan toimittanut—Text edited by A. Benj. Helander. Valokuvat—Photos by Otso & Matti Pietinen. Kuvien tekstit—Picture captions Otso Pietinen. Helsinki—Helsingfors, Sininen Kirja Osakeyhtiö, 1948. 222 p.

HEREDITY

SHULL, A. FRANKLIN. Heredity. 4th ed. New York, McGraw-Hill Book Co., 1948. 311 p.

PAPER—TESTING

AMERICAN SOCIETY FOR TESTING MATERIALS. *Committee D-6 on Paper and Paper Products.* A.S.T.M. standards on paper and

paper products (with related information). Methods of testing, specifications. Philadelphia, The Society, 1948. 275 p.

PAPER MAKING AND TRADE—ASSOCIATIONS

FINSKA PAPPERSINGENIÖRSFÖRENINGEN. Årsbok, 1948. Helsingfors, Frenckellska Tryckeri Aktiebolaget, 1948. In Swedish, 173 p.; in Finnish, 175 p.

FINSKA PAPPERSINGENIÖRSFÖRENINGEN. Föredrag . . . Helsingfors [The Association] 1948. v. 8 and 9. 335 + 320 p.

MOLAE chartariae suecanae. Svenska Pappersbruksföreningens tjugufemårsskrift. Stockholm, The Association, 1923. 2 v. 198 and 388 p. + 116 plates.

SVENSKA Pappersbruksföreningen, 1923-1948. Minnesskrift vid 50-årsjubileet [Stockholm, The Association, 1948] 559 p. + 1 fold. chart.

PHYSICS

PHYSICAL SOCIETY OF LONDON. Reports on progress in physics. London, The Society, 1948. v. 11 (1946-47). 461 p.

PUNCTUATION

SUMMEY, GEORGE, JR. American punctuation. New York, The Ronald Press Co. [c1949] 182 p.

SULFITE WASTE LIQUOR

VOGEL, HANS. Sulfitzellstoff-Ablaugen. Basel, Wepf & Co., Verlag, 1948. 302 p.

WETTING-OUT AGENTS

SCHWARTZ, ANTHONY M., and PERRY, JAMES W. Surface active agents; their chemistry and technology. New York, Interscience Publishers, Inc., 1949. 579 p.

Survey of Periodical Articles

The following are abstracts of opinions expressed by writers in the technical journals. The Institute of Paper Chemistry takes no responsibility for the opinions here summarized.

ACID PLANT

Voss, W. K. The steam jet refrigeration system for sulfite acid making. Pulp Paper Mag. Can. 50, no. 3: 232-3, 285-6, 288, 290 (Convention, 1949).

Reference is made to the hot-weather difficulties caused by high water temperatures and reduced sulfur dioxide absorption experienced at the sulfite mill of The Ontario Paper Co. Ltd. at Thorold, in common with other sulfite mills. Less tonnage was produced during the summer months and pulp quality suffered because of the higher temperatures necessary to force digesters with the lower strength cooking acid. Between the summers of 1947 and 1948 a 150-ton Ingersoll-Rand steam-jet refrigeration unit was installed for the purpose of cooling the process water to the limestone towers from 75 to 50° F. The principle of operations is as follows: Water is admitted to an evaporator kept under a high vacuum by the use of steam-jet boosters discharging into a barometric condenser. At the high vacuum of 29.6 mm. mercury, water boils or flashes into vapor. By evaporating 1% of this water under a high vacuum, the latent heat of evaporation causes a decrease in sensible heat of the remaining 99% of the water being cooled, the evaporation of 1% corresponding approximately to a decrease of 10° F. A detailed description of the equipment and its operation is given, supplemented by a diagram. There have been no unusual operating or maintenance problems in connection with the steam-jet cooler. The acid maker operates the unit, which requires very little of his time. The unit is shut down in the fall and started again before warm weather sets in. During the summer of 1948 there was no dip in production as in previous years and the number of cooks per day and the degree of chip packing were maintained during the entire period. The purchase price of the equipment was approximately $13,000, which is close to the savings resulting from the decrease in sulfur and limestone consumption during its period of operation. In decreasing the temperature of the acid-making water from 75 to 50° F. in a mill producing 200 tons of pulp per day, the steam cost for operation amounts to about 15 cents per ton of pulp, using a steam cost for fuel at 40 cents/1000 lbs.

E.S.

ADHESIVES—TESTING

Gilman, Lucius, and Lowell, Stanley J. Adhesives for phenol-formaldehyde laminates. Modern Plastics 26, no. 7: 95-8, 132, 134 (March, 1949).

The authors report on investigations of the performance of adhesives which set at room temperature and can be used in assembling phenol-formaldehyde laminates with a fabric base. Most of the evaluation was based on shear strength determinations. The experimental procedure is described and data are tabulated. It was found that details of the assembly procedure and material preparation affect the strength of the bond, some to a very marked degree. Pressure, temperature of cure, and lapse of time between mixing and using the adhesive do not require close control. Catalyst ratio, open assembly time, the condition of the surface of the laminate, the

type of laminate, and the space between the pieces of laminate being bonded affect shear strength extensively. Considerable variation exists which is inherent in the materials or caused by factors not yet isolated and brought under control; differences in technique seem to affect the results. It is necessary to allow for this contingency. Urea-formaldehyde materials are not particularly adapted to bonding phenol-formaldehyde laminates; furfuryl alcohol materials show rather erratic results. A resorcinol-containing material with a primer gave outstanding results, showing a dependable strength of about 590 p.s.i. A phenol without a primer gave a reliable shear strength of about 150 p.s.i. Both are highly resistant to heat and cold and are unaffected by ester and aromatic solvents. The former is very resistant to water, and the latter fairly so. R.R.

ALCOHOL

KILP, WALTER. Sulfite alcohol and its manufacture. Wochbl. Papierfabr. 77, no. 1: 9-12 (January, 1949). [In German]

The author describes the equipment of a typical sulfite alcohol plant, the sequence of operations, distillation of the liquor, and utilization of slops. E.S.

ASSOCIATIONS

BRITISH PAPER AND BOARD INDUSTRY RESEARCH ASSOCIATION. Progress of Research Association. World's Paper Trade Rev. 131, no. 4: 256, 258; no. 8: 490, 492, 494, 527-8 (Jan. 27, Feb. 24, 1949).

Excerpts are given from the fourth annual report, which is divided into the three sections: building conversion, organization, and research program. The adaptations at St. Winifred's have been completed and the premises with surrounding land purchased by the Association. Present activities and publications are reviewed. E.S.

JONES, DOUGLAS. Review of activities of the Technical Section 1948. Pulp Paper Mag. Can. 50, no. 3: 121-4 (Convention, 1949).

The report of the Secretary-Engineer, Technical Section, Canadian Pulp and Paper Association, covers membership, finance, the 1948 summer meeting, branch and committee activities, the Pulp and Paper Research Institute of Canada, publications, and Technical Section awards. E.S.

MACDONALD, R. G. TAPPI reflects industry's 1948 progress. Paper Trade J. 128, no. 8: 116, 118, 120, 122 (Feb. 24, 1949); Tappi 32, no. 3: 35A-36, 38A, 40A (March, 1949); Paper Mill News 72, no. 9: 101-3 (Feb. 26, 1949); Southern Pulp Paper Manuf. 12, no. 3: 54, 56, 58, 60-1 (March, 1949); *cf.* B.I.P.C. 18: 498.

The text of the annual report for 1948 of the Secretary-Treasurer of the Technical Association is presented, covering membership, necrology, special reports, employment, fall meetings, publications, TAPPI medal award, local sections, and divisions and committees, including officers and personnel changes. E.S.

BARKERS AND BARKING

DICK, GEORGE M. Recent developments in welded barking drums. Pulp Paper Mag. Can. 50, no. 3: 215-19 (Convention, 1949).

The author discusses the application of welding to the barking drum shell construction. As a result of an investigation of existing barking drums on which welding had been used and welding applications for other purposes, the following design was finally adopted. The drum consists of a series of longitudinal steel staves of a specially designed section having wide flanges where the staves come in contact with the circumferential members (Isherwood design adopted from shipbuilding). The edges of these circumferential plates are provided with a series of projecting fingers which are welded to the flanges, allowing the loadings from the plates to be transferred gradually and not abruptly to the staves, thereby avoiding severe changes in loadings with consequent stress concentrations. It is claimed that the application of modern welding technique and design to barking drums represents a significant improvement in the construction and maintenance of the equipment. 7 illustrations. E.S.

BEECHWOOD

FREUDENBERG, KARL, MOLTER, HANS, and DIETRICH, GUSTAV. Preparation of xylose from beechwood. Diacetoneglucose. Chem. Ber. 80, no. 1: 53-5 (January, 1947). [In German]

The diacetone derivatives of xylose and arabinose were separated from those of other sugars by distillation, and then separated from each other by conversion of the xylose compound into the monoacetate derivative. Details of the xylose and arabinose separation from beechwood and beechwood sulfite waste liquor are given. Preparations of diacetoneglucose are outlined, and glucose losses are discussed. L.E.W.

BENTONITE

JORDAN, JOHN W. Organophilic bentonites. I. Swelling in organic liquids. J. Phys. & Colloid Chem. 53, no. 2: 294-306 (February, 1949).

Organophilic bentonites have been prepared by the reaction of bentonite with various aliphatic ammonium salts. The swelling of these complexes in organic liquids and liquid mixtures has been observed, and a mechanism is advanced to account for the solvation phenomenon. The degree of solvation depends upon at least three factors: (1) the extent of the surface coating of the clay particles by organic matter; (2) the degree of saturation of the base-exchange capacity of the clay by organic cations; and (3) the nature of the solvating liquid. 15 references. E.S.

BLEACHING

RUSSELL, LAWRENCE E. Pulp bleaching processes. Paper Trade J. 128, no. 12: 23-6 (March 24, 1949).

After a brief explanation of the terms commonly used in the bleaching process (available and residual chlorine, brightness, etc.), the author discusses the bleaching agents and processes used for the treatment of the different types of wood pulp. Brief reference is made to continuous and batch-type bleaching equipment, corrosive conditions, and materials of construction. E.S.

SCHULTÉN, KURT AF. The bleaching of sulfite pulp, review and experiences. Svensk Papperstidn. 52, no. 2: 33-40 (Jan. 31, 1949). [In Swedish; German and English summaries]

The author reviews the advances in the bleaching of sulfite pulp discussing, in turn, the unbleached pulp, bleaching agents, the process water, bleaching

procedures, multistage bleaching using different combinations and sequences of procedures, and bleaching apparatus. He emphasizes the fact that it is now possible to bleach satisfactorily any normal sulfite pulp. The number of useful bleaching agents has increased, making the manufacture of bleached pulps for special purposes possible. An important development is the technical use of chlorine dioxide. Special attention has been paid to the removal of the residual lignin under mild conditions and without damage to the cellulose. Since the residual lignin in the unbleached pulp is not a homogeneous substance but consists of fractions of different solubility, considerable quantities of chlorine can be saved if the slightly condensed (and, hence, readily soluble) lignin fractions are removed by the addition of a small amount of an oxidizing agent, such as hypochlorite, before the chlorination stage. This applies particularly to the bleaching of strong sulfite pulps, in which the slightly condensed fractions of the residual lignin are present to a considerably greater extent than the highly condensed fractions. Since the use requirements of chemical pulps for different purposes are now well defined, it has become possible to determine in advance how such pulps should be produced, and how the various processes should be applied to obtain the best results. E.S.

BLEACHING—GROUNDWOOD

REICHERT, J. S., and PETE, R. H. Peroxide bleaching of groundwood; recent developments and commercial status. Tappi 32, no. 3: 97-107 (March, 1949).

The peroxide process for bleaching groundwood is now in commercial operation on an extensive scale. Paper-mill operations have shown that bleached groundwood can be used with technical and economic advantages in the manufacture of a wide range of papers. The authors present a comprehensive summary of the peroxide process for bleaching groundwood. A history of the process is given, including a description of such factors as (*a*) the chemistry of peroxide bleaching, (*b*) bleaching equipment, (*c*) operation of the process, (*d*) variables in the process, (*e*) applications of the bleached pulp, and (*f*) a bibliography of pertinent literature and patent references. Peroxide bleaching of groundwood in mixtures with sulfite pulps is likewise in successful commercial operation. A description of the process for bleaching mixtures of groundwood and sulfite pulps is therefore included in this paper. 60 references. E.S.

BOARD

HAMILTON, GEORGE, and DUTTON, BRUCE. What will happen to paperboard prices in 1949? Shears 67, no. 674: 18-21 (February, 1949).

A recent survey indicates that 67% of the paperboard manufacturers expect stable prices for boxboard in 1949 and 33% anticipate price rises. Impending increases in labor costs, government proposals to tax corporations more heavily, and a rise of about 6% in freight rates are influencing these opinions. About 67% of the fiber-container manufacturers expect stable prices and 33% look for decreases; of other paper-box makers, 40% expect firm prices and 60% anticipate cuts. Reasons given for the expectations of declining prices are the new capacity coming into production, decreasing demand, and the belief that board profits have been too great for too long. Although the board market has been shifting from a seller's to a buyer's market, business is still at a high level and there is no feeling in the industry that a slump is near. R.R.

STARK, N. H., & COMPANY, INC., *Thiensville, Wis.* Continuous impregnation of fibrous materials. Fibre Containers 34, no. 2: 31 (February, 1949).

Application has been made for patents on a continuous method of impregnating paper and paperboard (Stark process). A continuous web or series of blanks pass through an evacuated zone into the impregnant, which may be at or above atmospheric pressure, and then through a wiper arrangement which removes excess surface material. The equipment required is relatively simple. Speeds of at least 500 ft./min. are possible. The choice of impregnant is of great importance; it must be free flowing to permit high production speeds. R.R.

VIVIAN, C. H. Paperboard, our most-used paper product. Compressed Air Mag. 54, no. 1: 2-8 (January, 1949).

Board mills, large consumers of waste paper, now account for over half of the tonnage of the country's paper production. The domestic container industry had its inception in the home of Andrew Dennison in 1844, when he began making jeweler's boxes, which were imported at that time. Mandrel-fashioned heavy paper containers, their ends fastened with tacks and string, were used for packaging tacks, and in the 1890's great impetus was given to the industry when the newly formed National Biscuit Co. began to sell packaged crackers. The process of corrugating heavy paper by passing it through rolls or dies was patented in England in 1856. In 1887 J. J. Hinde and J. J. Dauch began the manufacture of corrugated-board boxes, which met with strong prejudice in favor of wooden containers. A shortage of lumber for boxes during World War I helped the corrugated-container industry, with the result that production rose from 700,000 tons in 1919 to 2,732,000 tons in 1936. In 1948 over 60 billion square feet of paperboard were consumed by the container industry. A description is given of the manufacture of Fourdrinier and combination board and the differences between and the uses of container and box board and folding and set-up boxes are discussed. An illustrated description is given of board manufacture at the Alton mill of the Alton Box Board Co. R.R.

BOARD—FINISH

DICKEY, ROGER C. Paraffin coatings. Graphic Arts Monthly 21, no. 3: 84, 86 (March, 1949).

In answer to a request for information regarding the waxing of butter cartons, the author refers to the satin finish and the high-gloss finish; the latter is the more popular because of its attractiveness and greater protection. For the latter finish, paraffin is applied to the blanks by a series of felt-covered rolls at approximately 180-190° F. The blanks then pass through a cold water bath (about 40° F.) where the coating is congealed. In the satin process, the blanks are fed to a waxer where steel rolls apply the paraffin, which is driven into the fibers of the board; no refrigerated water tank is used. The satin process requires less expensive equipment. R.R.

BOARD—STATISTICS

ØDEGAARD, NIELS. The Norwegian wallboard industry 1948. Norsk Skogind. 3, no. 1: 11 (January, 1949). [In Norwegian and English]

Conditions prevailing in the Norwegian wallboard industry during 1948 are reviewed; the estimated capacity is about 70,000 tons, but only about

39,000 tons were produced on account of rationing of electric power, mill alterations, etc. E.S.

BOARD SPECIALTIES

ANON. Corrugated honeycomb-core panels. Fibre Containers 34, no. 2: 24, 26, 31 (February, 1949); *cf.* B.I.P.C. 18: 356.

Two years of testing an outdoor experimental housing unit at the Forest Products Laboratory have shown that corrugated 45-pound kraft paper can be successfully used as the basic material in forming honeycomb cores for house panels. An illustrated description is given of the unit, panel construction, and tests run on the panels. Commercial interest has been high, but the manufacturing cost has been a drawback. R.R.

ANON. Progress with corrugated pallets. Fibre Containers 34, no. 2: 32, 34, 36 (February, 1949).

The Addison-Semmes Corp., Racine, Wis., is licensing concerns to make, use, and sell its expendable pallets. An illustrated description is given of the box-type pallet, or Power Package, which may consist of a regular slotted container, half-slotted container with cover, double cover box, full telescope, etc., attached or not attached to the pallet base. Groups of individual boxes may be built into pallets by interlocking block loading patterns, glue-locked loads, tray caps or hoods, strapping, etc.; a system of nested trays is also used. Illustrated examples are given of expendable pallet packaging and materials handling to show possible reductions in package materials and labor costs. R.R.

GENERAL FOODS CORPORATION. Jell-O "deal" packaged with heat-seal treatment. Packaging Parade 17, no. 194: 56-7 (March, 1949).

A combination package of Jell-O puddings consists of a heat-sealed printed U-board around the top, back, and bottom of three boxes. A thermoplastic adhesive is used to seal the unit packages in the paperboard tray. Strips of Teflon 0.1 inch thick were placed beside the hot plates used in the sealing operation to keep them from smudging the print on the tray. R.R.

BOARD TESTING—PHYSICAL

CHAPMAN, S. M. Correlation of the Board Committee test for surface oil resistance of paperboard with the results of gloss ink printing. Pulp Paper Mag. Can. 50, no. 3: 201-3 (Convention, 1949).

In the printing of paperboard with gloss inks, trouble is frequently encountered with poor or uneven gloss. These inks dry mainly by oxidation of the vehicle and obtain their gloss by the drying of this vehicle to a smooth shiny film. If, however, the vehicle penetrates deeply into the surface of the paperboard before drying, little or no gloss will be obtained. For best results it is essential, therefore, that the board surface present considerable resistance to the penetration of the vehicle. The Board Committee of the Technical Section, C.P.P.A., introduced some time ago a method for determining the surface oil resistance of paperboard as a means for evaluating its suitability for gloss ink printing. This test requires that a drop of a standard mineral oil be placed upon the surface of the board under standardized conditions, and be spread out into a film by allowing a heavy roller to run down an inclined plane passing over the oil drop, at which time a stop watch is started. Using a Photovolt model 660-P photoelectric glossmeter, the gloss of the oil film is determined. The gloss decreases as the oil penetrates into the surface of the board; when the reading reaches halfway be-

tween 100% at the start and the gloss of the original board surface determined previously, the endpoint is reached and the watch stopped. All readings are corrected to 73° F. The present investigation deals with studies of the degree of correlation existing between the surface oil resistance test (using a mineral oil) and the actual behavior of the samples when printed with a gloss ink. A Vandercook no. 4 proof press, a gloss ink, and a solid printing plate were used on nine test samples of each type of board, which were printed with increasing amounts of ink (coverage from 0.5-6.0 g./sq. m.). After drying overnight, the prints were tested for gloss—two tests in the machine and two in the cross-machine direction of each sample. The average of the four tests was compared with the surface oil resistance data obtained just prior to printing. The results are shown in a table and four diagrams. They indicate a fair degree of correlation between the surface oil resistance as measured by the Board Committee test and the results of printing with gloss inks. However, it is not possible to state definite standards for minimum or maximum test values on the basis of the data obtained. It is believed that such standards can be estimated more accurately by the mills on the basis of their operating experience. E.S.

ÖGLAND, N. J. The swelling and shrinkage of hard fiberboards. II. Finnish Paper Timber J. 31, no. 4: 57-60 (Feb. 28, 1949); Svensk Papperstidn. 52, no. 6: 138-41 (March 31, 1949). [In Swedish; English summary] *cf.* B.I.P.C. 19: 77-8.

The swelling and shrinkage of hardboard over the whole range of relative humidities at 5°, 25°, and 50° C. have been determined. Slight modifications in the apparatus and procedures employed in part I are described. The following results are reported: At a given R.H., an increase in temperature corresponds to a decrease of swelling in thickness; the swelling and shrinkage in the machine direction are independent of temperature. The swelling properties in moist air can be calculated from the swelling in thickness of the sample after half an hour's immersion in boiling water. An increasing density corresponds to an increase of the swelling in thickness, whereas the expansion in the longitudinal direction remains practically unchanged. Hence, the increase in expansion in the machine direction of porous and hard fiberboards is more or less identical, whereas the increase in the swelling in thickness is much lower in the case of porous boards. In conclusion, an experiment is described to show that swelling and shrinkage are not eliminated by nailing. 6 figures and three tables. E.S.

BONDED FIBER WEBS

SEYMOUR, R. B., and SCHRODER, G. M. The present status of bonded fabrics. Rayon and Synthetic Textiles 30, no. 2: 49-50; no. 3: 43-4 (February, March, 1949); Paper Trade J. 128, no. 13: 16-18 (March 31, 1949).

The authors describe the formation of a sheet or lap of fibers using either paper or textile machinery. Almost any fiber may be used as a primary fiber, provided it does not soften completely during subsequent operations. The primary fiber in most bonded fabrics is cotton or viscose rayon. The secondary fiber used as bonding agent may be a thermoplastic material, such as cellulose acetate, Vinyon, etc. The final form of bonded fabrics made from fiber blends will depend to a large extent upon the secondary fiber and the temperature and pressure used in the bonding operation. It may resemble either cloth or paper. Laboratory experiments have indicated that almost any thermoplastic fiber may be used, although it may be necessary to admix a plasticizer in order to simplify the welding procedure. The bonding agent

may also be added in the form of a melt, solution, or emulsion, using specific conventional equipment. A number of patented processes are reviewed. Present and possible applications are discussed. The bulk of the material is used for expendable items, such as towels, wiping cloths, diapers, napkins, hospital sheets, etc. The advantage of bonded fabrics in plastic laminates is illustrated by tabulated data, comparing the physical properties of laminates made with cotton duck, cotton linters, and a bonded fabric (Steralon). 42 references. E.S.

CALCULATIONS

AUDINO, HECTOR. Calculating boxboard weights, numbers and counts. Fibre Containers 34, no. 2: 94, 96, 98 (February, 1949).

The author gives information, including graphs and tables, for calculating the weight of board and number of bundles necessary for a given paperboard job, interpreting the points used by some manufacturers in terms of No. 1, 2, 3, and 4, as defined in Simplified Practice Recommendation R44-36, and determining the count when the regular number is given. Problems and their solutions illustrate the discussion. R.R.

CASEIN

ANDERSON, NILS, JR. Casein in the world market. Paper Trade J. 128, no. 8: 86-7 (Feb. 24, 1949); *cf.* B.I.P.C. 18: 501-2.

There was very little fluctuation in the price of casein during 1948, domestic casein selling for around 32-33 cents/lb. and Argentine casein ranging between 25 and 27 cents/lb. Production in the United States in 1948 is estimated at about 13,700,000 pounds; imports from Argentina amounted to about 15,000-16,000 tons. Although consumption of casein in prewar days was about 80,000,000 pounds in the United States, it is now closer to 50,000,000 pounds. Soybean proteins, thermoplastic resin emulsions, urea resins, and machine coating of paper with starch have effected substitution. Paper coating manufacturers use the most casein and may continue its use on a large scale, depending on price. Prices in 1949 will be influenced by governmental action, not only in the United States and Argentina but possibly in other countries, which will be substantial buyers. On the whole, casein is expected to reach a more normal prewar position in 1949; however, the situation is not settled and buyers should refrain from carrying large stocks until further clarification. Tabulated statistical data for 1944-1948 are included. E.S.

WALSH, J. M. The casein outlook for 1949. Paper Trade J. 128, no. 8: 87 (Feb. 24, 1949).

Around February 1, 1949, the prospects are for a much greater domestic production of casein and also for normal supplies from Argentina. It is still too early to make definite predictions with regard to prices. E.S.

CAUSTIC SODA

SKEEN, JOHN R. Caustic soda. Soap Sanit. Chemicals 24, no. 2: 49, 155 (February, 1949).

If available production facilities operate at their maximum, there should be an adequate supply of caustic soda this year. A history is given of the development of increased production and demand and data are tabulated on production, exports, electrolytic capacity, price, and consumption for soap, rayon, and rubber from 1917 to 1948. R.R.

CELLOPHANE

ANON. Cellophane helps in covering dampeners. Modern Lithography 17, no. 2: 36 (February, 1949); U. S. Army Map Service Bull. no. 19.

Roller covers can be pulled on easily if cellophane is carefully put on the dampener rollers. It should butt join smoothly across the length of the roller and may be held in place by a single strip of thin transparent scotch tape. The wrap should overhang one or two inches beyond the roller proper; the edges should be folded down and taped to the spindles. If the cellophane is put on carefully, it will last for three or four covers. Illustrations are given. R.R.

PAPER SALES. Cellophane lets the buyer see. Paper Sales 9, no. 3: 20-2, 42 (March, 1949).

The advantages of visibility in cellophane packaging are emphasized as an aid to salesmen carrying this product. The best outlets for the item are in the food-packaging field; wraps for tobacco, wearing apparel, sporting goods, jewelry, boxed candy, and fruit baskets will also provide good markets. Transparent cellulose film often yields twice as many sheets and bags as does less expensive but heavier waxed paper, which makes the film less expensive in the long run. A question-and-answer feature provides additional information on the manufacture, types, available sizes and thickness of sheets, and printability of cellophane. R.R.

CELLULOSE

MARK, HERMAN F. Submicroscopic structure of wood constituents. Tappi 32, no. 3: 108-9 (March, 1949).

The author discusses the submicroscopic physical structure of cellulose fibers, with special emphasis on crystalline and amorphous areas, and the three "nondestructive" methods for estimating their percentages: the evaluation of x-ray diagrams, the specific gravity of the material, and the rate of exchange of cellulose with deuterium oxide. These methods lead to concordant results, if applied to the same samples, and indicate that most native celluloses consist of about 50-60% crystalline material and 40-50% easily accessible areas or amorphous material. Only a few special samples, such as bacterial cellulose, immature cotton fiber, and vigorously shredded ramie, contain much smaller percentages (10-20%) of crystalline substance. E.S.

CELLULOSE—DERIVATIVES

KOTTE [H.] Cellulose as chemical raw material. Neue deut. Papier-Ztg. 3, no. 3: 88-91 (Feb. 15, 1949). [In German]

The Chemische Fabrik Kalle & Co., Wiesbaden, Germany, is the country's chief producer of cellophane. Reference is made to the many applications of this product as wrapping material, sausage casings, shrunk-on bottle cappings, for decorative purposes, weaving hats, etc. The starting material (viscose) is also employed for the preparation of adhesives and ethylcellulose (Tylose) is used for sizing paper and textiles (among many other applications). The firm also manufactures films from noncellulosic materials (Supron), as well as the Ozalid brands for copying technical drawings, etc. E.S.

CELLULOSE—HEMICELLULOSE

WISE, LOUIS ELSBERG. The chemistry of the hemi-celluloses. Pulp Paper Mag. Can. 50, no. 3: 179-86 (Convention, 1949).

The author presents an extensive review of the subject under the subheadings: researches of Schulze, studies by O'Dwyer, investigations at the University of Arizona, hemicelluloses of annual plants, esparto xylan, "molecular weights" of hemicellulose fractions, hemicelluloses from holocellulose, the possible lignin-hemicellulose union, relationship between hemicellulose and cellulose, and future research. 54 references. E.S.

YUNDT, ALBERT P. Crystalline xylan and mannan. J. Am. Chem. Soc. 71, no. 2: 757-8 (February, 1949).

A xylan-rich fraction from barley straw was purified by the Salkowski method and partially hydrolyzed with 0.2% oxalic acid. The insoluble portion, on autoclaving at 120° C. and cooling to 60-70°, deposited a xylan in the form of hexagonal platelets with rounded corners which, after recrystallization, contained 99.5% pentosans (calculated as xylan), with a D.P. of 39. A similar crystalline xylan from birchwood showed a D.P. of 35. Mannan A from ivory nuts crystallized in rods or dumbbell-shaped crystals, and a fraction from slash pine (containing about 50% mannan) also crystallized. L.E.W.

CELLULOSE—HOLOCELLULOSE

HAAS, H. Composition of the cellulose and polyose fractions of various hard- and softwoods. Makromol. Chem. 2, no. 3: 217-26 (October, 1948). [In German]

Skeletal substances (holocelluloses) were prepared by the chlorine dioxide method of Erich Schmidt and co-workers (*cf.* B.I.P.C. 8: 129-30) and Staudinger and co-workers (*cf.* B.I.P.C. 8: 134-5) from the following woods: maple, elm, two poplar species (*Populus alba* and *nigra*), aspen, black locust, willow, ash, birch, black alder, beech, umbrella tree, eucalyptus, silver fir, Scotch pine, Douglas fir, northern white pine, and spruce. The yields varied from about 64 to about 73%. These products were then separated by means of Haas' cuprammonium hydroxide technique (*cf.* B.I.P.C. 13: 463-4) into three fractions: (I) with D.P. up to 150, (II) with D.P. 150-1000, and (III) with D.P. above 1000. (II) was usually very small and never exceeded 14% of the mother substance. (I) ranged from 13-30%. This was the so-called "wood-polyose fraction." (III) ranged from 40-55%. (II) in the case of hardwoods consisted largely of pentosans and polyuronides (55-70%) and the residual hemicelluloses are ascribed mainly to the glucans. In the softwoods, (I) contained 19-39% pentosans and polyuronides, 25-44% mannans, and 26-45% glucans. (III) still retained small amounts of pentosans and uronic acids (1.5-3.1%) and, in the case of the conifers, 0.7-3.4% mannans. The pentosan fraction is tenaciously retained by (III), even after alkaline extraction and hydrolysis. The author, however, claims that the mannose units can be removed hydrolytically from (III). In general the higher the D.P. of the fraction, the lower the noncellulosic components; e.g., in the case of beech, a fraction with D.P. 1210 retained 3.8% pentosans, whereas a fraction with D.P. 1730 retained only 2.1%. Similarly, a fraction of the aspen holocellulose with a D.P. of 1000 retained 5.6% pentosans, whereas a fraction with a D.P. of 1740 retained only 1.5%. Detailed tabulated data are given. 22 footnotes. L.E.W.

SITCH, D. A. The isolation and fractionation of white birch holocellulose. Pulp Paper Mag. Can. 50, no. 3: 234-6, 290, 292 (Convention, 1949).

Two methods of isolating the holocellulose from white birch were investigated. The Van Beckum and Ritter procedure was modified by the use of water as a dispersion medium during chlorination. A rapid delignification

of a large batch of wood meal was effected without appreciable losses of carbohydrate. The absence of a color change with ethanolamine after chlorination did not necessarily indicate the complete removal of lignin. The chlorite process of Jayme resulted in some loss of carbohydrate. A fractionation of white birch holocellulose was attempted by a series of extractions with water at various temperatures and with aqueous ethylenediamine solutions at different concentrations. The materials extracted by water at 95° C. and by 75% ethylenediamine at 95° C. were isolated by precipitation from alcohol. The molar ratio of pentose to uronic acid was approximately 5:1 in the water-soluble hemicellulose and 8:1 in the ethylenediamine-soluble hemicellulose. Methoxyl and acetyl were present in these materials, although there was some evidence of partial saponification of the latter during the extraction with ethylenediamine. The relative merits of extraction with organic bases and caustic alkalies should be shown by future viscosity data. 26 references. E.S.

CELLULOSE—OXYCELLULOSE

HUSEMANN, E., and GOECKE, M. Macromolecular compounds. 331. Weak spots and their cleavage velocity in oxidatively degraded cotton and ramie cellulose. I. Homogeneous degradation in cuprammonium solution by atmospheric oxygen. Makromol. Chem. 2, no. 3: 298-314 (October, 1948). [In German]

In previous work, Husemann and Schulz (*cf.* B.I.P.C. 14:86-8; 18: 10, 357-8), through fractionation of the cellulose nitrates and comparative osmotic and viscometric determinations of the D.P. of hydrolytically degraded cotton and ramie samples, have shown a deviation of the experimental distribution curves from the statistical distribution which indicated an accumulation of material with a D.P. between 400 and 500. In the present work the same procedures have been applied to cotton and ramie, from each of which a polymer-homologous series of oxidatively degraded celluloses has been prepared by dissolving in cuprammonium solution and treatment with different amounts of atmospheric oxygen. The average D.P. ranged from an initial value above 2000 to approximately 200 for the most degraded members. The same accumulation of chain lengths in the 400-500 range was shown for both materials. It is concluded (as before) that different linkages must exist at intervals of about 500 units in the cellulose chain. In these experiments with oxidatively degraded cellulose they were broken about 3000 times as rapidly as the normal β-glucosidic linkages. The rate of cleavage was quite similar with both cotton and ramie, and differs in this respect from the hydrolytically degraded material for which the linkages in ramie were split more rapidly than in cotton. The experimental method gives no information on the chemical nature of the linkages and it cannot be concluded whether the hydrolytic and oxidative weak spots are identical or whether they differ chemically but exist at about the same intervals along the molecular chains. 11 footnotes. M.A.H.

CELLULOSE ESTERS

DICKEY, E. E., and WOLFROM, M. L. A polymer-homologous series of sugar acetates from the acetolysis of cellulose. J. Am. Chem. Soc. 71, no. 3: 825-8 (March, 1949).

A product obtained by the acetolysis of cellulose has been resolved by a chromatographic technique into a polymer-homologous series of crystalline α-D-acetates, ranging in D.P. from 1 to 6, inclusive. A correlation of melting points and specific rotations with D.P.'s has been made. 22 footnotes. E.S.

IZARD, E. F., and MORGAN, P. W. Synthesis of disulfide cross links in polyvinyl alcohol and cellulose derivatives. Ind. Eng. Chem. 41, no. 3: 617-21 (March, 1949).

α, α'-Dithiodiacetyl and (methylenedithio)diacetyl cross links were introduced into polyvinyl alcohol and cellulose esters by reaction of substituent chloroacetyl groups with sodium thiosulfate, followed by mild oxidation or treatment with formaldehyde. Disulfide cross links, attached directly to the polymer chain, were synthesized in cellulose esters by the reaction of substituent *p*-toluenesulfonyl groups with sodium thiosulfate, thiourea, or pyridine and hydrogen sulfide, followed by oxidizing aftertreatments. The thiourea reaction was also applied to polyvinyl *p*-toluenesulfonate. These cross-linking reactions were sufficiently mild so that little polymer degradation occurred. The cross-linked products in the form of films and fibers were insoluble in organic solvents and did not fuse below their decomposition points. The cellulose derivatives were not embrittled by degrees of cross linking as high as one link per five anhydroglucose units. The presence of the disulfide linkage was demonstrated by reduction of the cross-linked polymers to the soluble thiol form with thioglycolic acid and re-oxidation to insoluble structures. Thioacetal cross links could not be reduced in this way. 31 references. E.S.

CELLULOSE ETHERS

PENN, W. S. Some applications of carboxymethylcellulose in packaging. Brit. Packer 11, no. 3: 30, 35 (March, 1949); *cf.* B.I.P.C. 19: 151.

Generally speaking, carboxymethylcellulose can be used as a substitute for gelatin, glue, agar agar, gum arabic, tragacanth, etc. Its chief value in the packaging industry lies in its potential film-forming characteristics. Because it is physiologically inert and resistant to grease and oil, it can be used safely for such items as sausage skins and frozen and oily food wraps. Its high impermeability to gases makes it suitable as a wrap for dynamite cartridges and in gas-retaining fabrics. Films can be treated with wax to increase their moisture resistance. The material can also be used as a beater size and a surface size to make excellent greaseproof paper, for coating fabrics, and as an adhesive. R.R.

TASKER, CLINTON W., and PURVES, C. B. *p*-Toluenesulfonyl chloro and iodo derivatives of an alkali-soluble hydroxyethylcellulose. J. Am. Chem. Soc. 71, no. 3: 1023-8 (March, 1949).

A commercial alkali-soluble peroxide-free hydroxyethylcellulose (Ceglin E. S. type H) (I), substitution 0.44, was esterified at 25° with an excess of *p*-toluenesulfonyl chloride in pyridine, and sulfur, halogen, and alkoxyl (*cf.* Morgan, Ind. Eng. Chem., Anal. Ed. 18: 500-4 [1946]) were accurately determined at various time intervals. The rapid initial reaction was attributed to a primary hydroxyl content of 1.22 moles per glucose unit and at least 0.22 mole of the hydroxyethyl substituent (II) was tentatively assigned to secondary positions in (I). When tosylation was prolonged for 20-40 days, only 0.14 mole (II) remained in the product, the elimination of the 0.3 mole possibly being a measure of the polyethylene oxide units originally present as even-membered chains. The residual 0.14 mole was possibly attached directly to the cellulose either as monomer or as the initial unit in an odd-membered polyethylene oxide chain. Partial replacement of tosyloxy groups by halogen, using sodium iodide or pyridine hydrochloride, had relatively little effect on the hydroxyethyl substitution, but decreased the sum of the combined tosyl plus halogen substitution by 0.13 mole. Iodine (1.0 mole per

glucose unit) was introduced into one sample and 0.82 mole of chlorine into another, both substitutions presumably occurring in those primary hydroxyl groups remaining in the two samples. This large discrepancy (i.e., between 1.22 moles of primary hydroxyls and the number of moles as indicated by halogenation) is discussed at great length and the possibility that tosyl derivatives may cause slow alkylation of unsubstituted hydroxyl groups is outlined. 36 footnotes. L.E.W.

CHEMICAL TESTING—CHLORITES

BIELIG, HANS-JOACHIM, VOGELBACH, CURT, and WIELAND, THEODOR. An acidimetric method for determining hypochlorite and its application in the analysis of chlorite samples. Ann. 561, no. 2: 123-31 (Dec. 15, 1948). [In German]

The following method was used successfully in determining as little as 0.1 mg. sodium hypochlorite (I) (in the presence of chlorite, chlorate, or chlorine ions, or sodium hydroxide or carbonate). Five cc. of the solution containing 10 mg. (or less) (I) at 0° is added at the rate of 1 cc./min. to a micro-Kjeldahl flask (II) containing 15 mg. glycine in 5 cc. 2 *N* sodium hydroxide. Simultaneously dry steam is introduced into (II) which is heated so as to maintain a constant volume. Generated ammonia is passed into 20 cc. 0.01 *N* hydrochloric acid [1 cc. $\hat{=}$ 0.745 mg. (I)] which is back-titrated (using a mixture of methylene blue and methyl red as an indicator). A detailed sketch of the apparatus is given. The determination is accurate (usually within 1-6%) in the presence of a large excess of sodium chlorite. Quantitative methods for determining sodium chlorate, sodium chlorite, sodium chloride, sodium carbonate, and sodium hydroxide and insolubles are outlined and were applied to two samples of commercial sodium chlorite. 18 references. L.E.W.

CHEMICAL TESTING—PULP—ACID NUMBER

BROWNING, B. L. Apparatus for determination of polyuronide carboxyl. Tappi 32, no. 3: 119-20 (March, 1949).

A method is described for the quantitative determination of polyuronide carboxyl groups which is applicable to a wide range of fibrous materials, including woods, purified fibers, and isolated hemicelluloses and pectic preparations. It is based on the fact that uronic acids and polyuronides yield carbon dioxide quantitatively on refluxing with boiling 12% hydrochloric acid. The apparatus is relatively simple and compact in design. The experimental error is indicated by the standard deviation of 0.099% for a single analysis (based on 86 determinations). R.R.

COLOR-BLINDNESS

CHAPANIS, ALPHONSE. Diagnosing types of color deficiency by means of pseudo-isochromatic tests. J. Optical Soc. Am. 39, no. 3: 242-9 (March, 1949); *cf.* B.I.P.C. 18: 827.

One hundred and twenty men (86 color-normal and 34 color-deficient) were tested with five pseudo-isochromatic tests of color vision: the American Optical Company, Ishihara, Meyrowitz, Boström, and Boström-Kugelberg tests. Each of the men was also examined with a Bausch and Lomb visual spectrophotometer to determine his limit of visibility in the long wavelength (red) end of the spectrum. Twelve of the color-deficient subjects had reduced sensitivity and 19 had normal sensitivity to long wavelength radiation; three subjects could not be assigned to either group with certainty. Diagnostic plates in

three of the tests, the Boström, Meyrowitz, and Ishihara, were evaluated in terms of their ability to differentiate between the two kinds of color-deficient individuals. The Boström plates were found to be worthless for this purpose, the Meyrowitz plates somewhat better, and the Ishihara plates best. None of the plates in the other two tests was found to be diagnostic. 11 references. E.S.

JUDD, DEANE B. Response functions for types of vision according to the Müller theory. J. Research Natl. Bur. Standards 42, no. 1: 1-16 (January, 1949).

According to the Müller theory of vision there are three stages in the visual process, an initial photochemical stage, an intermediate chemical stage relating to the chromatic aspect, and a final stage of excitation of the optic-nerve fibers. By taking advantage of recent precise information regarding the metamers characteristic of normal, protanopic, and deuteranopic vision, there have been derived the spectral variations of the responses for each stage as functions of wavelength. These response functions account precisely for the same normal metamers as the ICI standard observer, and closely for the same confusions by color-blind observers as the simpler König theory. Furthermore, these functions describe chromatic thresholds of the normal eye (Abney, Priest-Brickwedde) as a gradual approach to tritanopic vision as field size and luminance are decreased. 47 references. E.S.

CONTRACT GING

ANON. Contract packaging. M Packaging 22, no. 7: 75-9 (March, 1949).

Contract packaging is a service performed by an organization with equipment, facilities, and personnel geared to carry out packaging operations for outside producers on a contract basis. It may include the receipt and storage of the product in bulk containers; the receipt of consumer-unit packaging material and shipping containers; formulating, blending, mixing, and assembling operations; packing containers for shipment; and making shipments and keeping records. This service was given great impetus during the war, with the result that it is now found almost anywhere in the country. Because automatic packaging equipment is so highly specialized, many contract packagers specialize in a comparatively few related operations or concentrate on a limited list of products. A staff of versatile workers is a prime requisite, because they must be able to change quickly from one type of operation to another. The advantages of such a system are given. R.R.

COOKING PROCESS

ENKVIST, TERJE, MOILANEN, MAURI, and ALFREDSSON, BO. Distillable compounds with lignin structure obtained by cooking wood with sodium hydrosulfide. Svensk Papperstidn. 52, no. 3: 53-60 (Feb. 15, 1949). [In German; English and Swedish summaries]

On acidification of a sulfate black liquor, about 25% of the lignin originally present in the wood remains in the aqueous solution. The same is true when a black liquor from a cook with sodium hydrosulfide at 160° C. is used. About half the water-soluble lignin is precipitated as an amorphous ether-insoluble product on heating the acidified filtered solution. The precipitates from two different experiments contained 50.76% and 57.89% carbon, 4.42% and 5.28% hydrogen, 10.65% and 11.85% sulfur, and 6.89% and 7.02%

methoxyl, respectively. Cooks of aspenwood with sodium hydrosulfide and hydroxide at 160° C. give black liquors from which, on acidification, extraction with ether, and distillation of the ether residue, about 0.5% (based on the wood used) distillate is obtained, in which the presence of succinic acid is indicated. Methylation of the black liquor and extraction with ether at pH 7 give acetovanillone and acetoveratrone in about 0.9% yield of the wood. Another 0.9% distillation fraction consists of products high in sulfur and methoxyl contents, but no vanillin, veratric aldehyde, or other aldehydes are found. A black liquor of a similar cook but without methylation gives 0.6% distillate from aspen; from spruce, 0.05% vanillin but no acetovanillone or veratrone is found. The formation of acetovanillone in sulfate and sulfite cooks is discussed. 18 references. F.E.B.

CORROSION

DUNCAN, R. D. Magnesium cathodic protection to inhibit corrosion of bronze facing wires on groundwood deckers. Pulp Paper Mag. Can. 50, no. 3: 187-91 (Convention, 1949).

Some of the basic principles of metallic corrosion are described. A mill installation is described in which magnesium anodes are used to provide cathodic protection for the facing wires of groundwood decker cylinders. Results show a substantial improvement in wire life. E.S.

LAQUE, F. L., and CLARKE, K. H. J. Corrosion in the manufacture of alkaline pulp. Pulp Paper Mag. Can. 50, no. 3: 221-8 (Convention, 1949).

Information is presented on the behavior of metals and alloys, when subjected to the action of the corrosive solutions encountered in the manufacture of alkaline pulp and the recovery of the chemicals used, under the following headings: corrosion in digesters, liquor heaters, diffusers, stock washers, alkali recovery, recovery of fatty acids from tall oil, smelter, and causticizing plant. 13 figures and 13 tables. E.S.

DYES AND DYEING

NEALE, S. M. The diffusion of dyes through cellophane—the anomalous salt effect. Trans. Faraday Soc. 44, no. 12: 1027-30 (December, 1948); *cf.* B.I.P.C. 18: 668-9.

The author summarizes the present state of knowledge and offers a tentative suggestion regarding the possible cause of the anomalous salt effect. For dyes in aqueous solution the diffusion coefficient decreases with addition of salt. In pure water the positive sodium ions proceed ahead of the color ions and set up a potential which then accelerates the movement of the color ions but, in the presence of excess sodium chloride, the negative chlorine ions reduce this potential gradient. Several curves show the effect of diffusion through cellophane at varying salt and dye concentrations. The effects shown in the curves cannot be satisfactorily explained as yet, although the idea has been proposed by the author that the suppression of electrical repulsion lies at the root of the anomalous effect. J.H.

EUCALYPTUS

COHEN, W. E. Pulp and paper from Australian eucalypts. Unasylva 2, no. 6: 309-15 (November-December, 1948); *cf.* B.I.P.C. 19: 392.

A report is given of the investigations made in Australia on the utilization of eucalyptus wood for pulp. Twenty years of work was necessary to prove that the wood was suitable and to bring about its acceptance in the industry. The Associated Pulp and Paper Mills Ltd., operating a soda-pulp mill at Burnie, Tasmania, the Australian Newsprint Mills Ltd., with a newsprint mill at Boyer, Tasmania, and the Australian Paper Manufacturers Ltd., with a kraft mill at Maryvale, Victoria, are discussed. Research is still continuing, chiefly on the structure of woods, their tracheids, and fibers, on the chemistry of wood polysaccharides and lignin, on methods of wood and pulp analysis, and on methods of pulp evaluation and paper testing. Annual Pulp and Paper Co-operative Research Conferences provide a means of discussing all investigations related to the industry as carried on by the Division of Forest Products. In 1947 the Australian Pulp and Paper Industry Technical Association held its first annual meeting and conference. Since World War II the industry has grown rapidly and expansion plans are attracting outside capital. Among the proposed and recently completed projects are mills for producing coated eucalypt papers and newsprint from eucalypt groundwood and long-fibered softwoods, much of which is now imported from Canada and which, it is hoped, will soon be supplied by the New Zealand plantations of *Pinus radiata.* R.R.

FIBER—STRUCTURE

FARR, WANDA K. The tertiary membrane of the plant cell wall. J. Phys. & Colloid Chem. 53, no. 2: 260-74 (February, 1949).

The cell wall of mature plant cells consists of two sheaths: the primary or original membrane surrounding the living protoplast and the secondary thickening deposited in layers upon the inner surface of the primary membrane. During the period of secondary layer deposition, a tertiary membrane is formed at the surface of the protoplast. In this tertiary membrane the protoplasmic materials to be used in building the secondary lamellas are accumulated. Spiral, ringed, and reticulate bands of granular cytoplasm are the precursors of the spiral, ringed, and reticulate patterns in the walls of many types of cells. The existence of the tertiary membrane and its function in cell-wall formation has been recognized by botanists for more than a century. The segregation and organization of granular materials are orderly processes and can be observed microscopically in many types of cells. Two marine algae, *Halicystis ovalis* and *Valonia ventricosa* Agardh, are shown to have particular value for the study of the tertiary membrane. In *Halicystis* the tertiary membrane is in the form of a green net of living chloroplasts. Within these chloroplasts the cell-wall materials are formed. They consist of granular cellulose and plastid plasma. Disintegrated plastids from the outer surface of the net are deposited layer by layer upon the inner surface of the wall. Some of the newly deposited layers are green with chlorophyll from the plastid plasma. *Valonia* has a fibrillar membrane in contrast to the granular membrane of *Halicystis.* Chloroplasts in its tertiary membrane produce long coiled fibrils of cellulose, in contrast to the granules of cellulose from the *Halicystis* chloroplasts. These cells provide excellent subjects for the study of forces which operate to organize cell-membrane materials into the many intricate patterns of mature cell walls. 31 references. E.S.

FINANCE

ROBERTS, ARTHUR. Where do you stand on your capital investment today? Fibre Containers 34, no. 2: 62, 64 (February, 1949).

Emphasis is placed on the importance of the return on invested capital, which is the ultimate yardstick of profitableness. The net profit on sales is

a secondary measure when considering the progress of a business over a period of years. The author believes that many concerns are earning less profit on their capital investment than in prewar years, which means overexpansion, high credit losses, or some kind of "invisible losses." R.R.

FIRE PREVENTION

VIVIAN, C. H. Paperboard, emergency fire protection. Compressed Air Mag. 54, no. 1: 9-11 (January, 1949).

Inventory reserves kept at a paperboard mill should approximate 10% of the annual requirements. Waste paper and straw are usually kept outside; pulp is stacked in open-sided sheds. Before 1947 the Alton Box Board Co. relied solely on a steam-driven pump inside the mill and one mobile fire engine equipped with a pump and a small chemical tank for fire protection. Because it is possible that all boilers might be shut down simultaneously, making the inside engine useless, emergency equipment has been set up in the form of an independent pumping station with its own source of power; it is housed directly over a corner of a million-gallon reservoir. An illustrated description is given of the equipment. More than two miles of underground piping extends throughout the raw-materials storage area. There are over 50 fire hydrants at strategic points and hose houses at frequent intervals. Fire towers are being erected. All mill departments are protected by a sprinkler system which is connected with the emergency pumping plant. R.R.

FOLDING BOXES

ANON. Compelling acceptance of an unknown brand through packaging. Packaging Parade 17, no. 194: 54 (March, 1949); *cf.* B.I.P.C. 19: 470.

Cranberry Growers, Inc., Wisconsin Rapids, Wis., is using three packages for its fresh produce: a cellophane bag, a folding paper window carton, and a gift package. The folding carton, constructed of .024 white patent coated newsback board, is a straight tuck-end style with notch locks and a window of no. 150 Lumarith. The larger gift package has a laminated outer coating and a die-cut window; ventilating holes in the gift package and its shipping container coincide. Frozen products are packaged in folding cartons which are overwrapped with waxed paper rotogravure printed to show a strong "family" relationship with the fresh fruit packages. R.R.

ANON. Play packages. Modern Packaging 22, no. 7: 114-16, 158 (March, 1949).

Illustrated descriptions are given of packages which can easily be made into toys, including a margarine carton which becomes a circus wagon when refolded with the inside out, paper milk containers which are scale models of railroad trains (*cf.* abstract below), corrugated containers designed and printed to form doll houses and garages, confectionary packages which resemble circus wagons and Indian teepees, children's toiletry cartons for re-use as miniature barber and beauty shops, and a children's picture projector container which can be used as a miniature theater, including the screen on which the pictures can be shown. R.R.

DEVENEAU, WILLARD F. Times have changed—so have packages. Paper Trade J. 128, no. 9: 23-5 (March 3, 1949).

The social and economic changes are mentioned which have had a decisive influence on packaging. The different steps of package development are outlined, from the convenience stage through the identification and first com-

petitive stage to the present merchandising stage. In the author's opinion, the six most important requirements for sales appeal in the self-service technique are: the package must attract attention; tell the product story; build confidence; look clean and sanitary; be convenient to handle, carry, and use; and look like a good value. A common mistake by a manufacturer is to take for granted that potential consumers know all about using his product, so that no directions need be given on the package. Herein lies a rare opportunity for the manufacturer to build goodwill among customers by giving them specific instructions for the use or care of the product. E.S.

FRESH-PAK FLOWERS, INC. *Townson, Md.* Prepackaged flowers fresh from grower to shopper. Am. Boxmaker 38, no. 3: 18 (March, 1949).

Folding window cartons with a Lumarith-film overwrap are being used for prepackaging flowers. Lumarith is used because it permits "breathing" and will not fog and hide the contents. The cut flowers are boxed in small quantities and held in position beneath the window by a clamp. R.R.

HALE, C. E. California dairy transforms milk cartons into complete line of model trains. Shears 67, no. 674: 24-5 (February, 1949).

An illustrated description is given of quart-size milk cartons (Train-Tainers) printed to resemble 12 different pieces of railroad rolling stock. The trains are easily assembled by notching the lip of the container top and making a slit in the bottom end. Other sizes of milk, cream, and cheese cartons provide motor trucks, platform wagons, station houses, and water towers. Initial dealer acceptance has been encouraging. R.R.

SCHOETTLE, EDWIN J., COMPANY, *Philadelphia.* Radically different type carrier carton for pastries, other foods. Packaging Parade 17, no. 194: 46-7 (March, 1949); Modern Packaging 22, no. 7: 106-8 (March, 1949); Shears 67, no. 675: 36-7 (March, 1949).

A new paperboard carton, called "Sure Handle," has a handle cut from the board normally wasted when the window is cut. The handle remains flat against the window until the perforations are loosened. The carton, which is illustrated, has been credited with increasing pie sales by 250% in a recent test. It can be glued and prefolded in one operation and is delivered flat to the wholesalers. R.R.

FORESTS AND FORESTRY

ANON. National situations. Unasylva 2, no. 6: 326-38 (November-December, 1948).

A summary is given of general forestry conditions and timber utilization in Australia, Burma, Ceylon, China, Fiji, Hawaii, India and Pakistan, Indo-China, Indonesia, Japan, southern Korea, Malaya, New Guinea and Papua, New Zealand, North Borneo, the Philippines, Sarawak, Siam, and the Solomon Islands. R.R.

GILLETT, CHARLES A. The American tree-farm movement. Unasylva 2, no. 5: 232-6 (September-October, 1948).

Following a review of the development of tree-farms from the first farm started by the Weyerhaeuser Timber Co. in Washington about 1940, the author discusses the movement. It is chiefly a form of recognition of a good

job of woodland management by which a local forest-practice committee ascertains the caliber of forest management and presents the successful owner with a certificate and a sign to mark his property as a tree farm. About 60% (500,000 acres) of the 1387 certified units are owned by farmers, 23% (2,000,000 acres) by industries, and 17% by general investors; unit sizes vary from 5 to 700,000 acres. There is no regulation of the end product. Supporting the tree farms is the Keep America Green movement, a program for mass education in forest-fire prevention. Today, for the first time, the United States is growing almost as much timber as it is using and losing by fire, insects, and disease. R.R.

LA COSTE, RICHARD. Alaska seeks new wealth in its pulpwood forests. Western Pulp and Paper 2, no. 3: 18-19 (March, 1949).

The virgin timber stand in Alaska comprises about 80 billion board feet, predominantly western hemlock and Sitka spruce mixed with western red and Alaska cedar, 75% of which is within 2.5 miles of tidewater. Under proper management this stand could produce in perpetuity about 25% of the annual newsprint consumption of the United States. A survey is given of the possibilities for water power. R.R.

LEE, SHUN-CHING, and HAN, NGAN. Forestry in China. Unasylva 2, no. 6: 304-8 (November-December, 1948).

Following a history of forestry in China beginning with the Chow Dynasty (1122-255 B.C.), consideration is given to present forest conditions, policies, administration, and utilization, reforestation, damage by flood and fire, forestry education, rehabilitation, and development. R.R.

POWELL RIVER COMPANY. Experimental plot allows close study of pulpwood forestry. Western Pulp and Paper 2, no. 2: 20-1 (February, 1949).

The Powell River experimental and demonstration forest covers 450 acres, on which the main forest type is 50-year-old Douglas fir. Work on the project began in 1948 with the preparation of a contour map and a forest inventory. The plan includes experiments in stand treatment to find the silvicultural practices best suited to the native species; studies in cutting and transportation methods; demonstrations, explanations, and participation projects to arouse public interest in forestry; work to terminate the firewood shortage in the district; and beautification of the area. Five permanent sample plots have been established for growth and yield studies; three will be thinned and two will be left in their natural state. R.R.

SEN, B. R. Utilization of the forest wealth of India. Unasylva 2, no. 6: 301-3 (November-December, 1948).

It has been estimated that 20-25% of India should be in properly managed and distributed forests. An estimated 25% is now forested, but only about 11% is reserved and protected as it should be; the present distribution of forests is far from meeting the needs of village consumers. The importance of forest management in the control of soil erosion and floods and the possibilities of using treated timber in place of scarce steel are discussed. Research on the production of paper from paper mulberry shows that, if such plantations are begun, the country should be able to supply its growing demand for newsprint within a reasonable time. R.R.

TAMESIS, FLORENCIO. Philippine forests and forestry. Unasylva 2, no. 6: 316-25 (November-December, 1948).

An illustrated discussion is given, including forest types, timber and minor forest products, the lumber industry, administration of the Philippine forests, important activities of the Bureau of Forestry, the Forest School of the College of Agriculture, University of the Philippines, forest research, and major problems. R.R.

FUEL

BEECHER, H. W. Burning of wood waste in the pulp and paper industry. Tappi 32, no. 3: 117-18 (March, 1949).

An evaluation of hog fuel, particularly as the pulp and paper mills of the Pacific Northwest are affected, is presented, together with observations on boiler operation when wood waste is used. E.S.

HARRIS, D. W. The combined firing of coal and wood refuse. Paper Mill News 72, no. 10: 10-13; no. 11: 47 (March 5, 12, 1949).

The supply of hogged fuel on the West Coast has been greatly reduced through better utilization of the raw material; moreover, the bark obtained from hydraulic barkers has a much higher water content, 60-70%, as compared with the previous figure of 50-57%. Only a small portion of the steam requirements of a pulp and paper mill can now be produced from wood refuse and supplemental fuel must be supplied. A table giving the analyses of seven different barks, some after salt-water storage, and their ash is included. A satisfactory boiler unit for high-moisture bark and coal is described, consisting of a continuous ash discharge spreader stoker with a travelling grate. Variations in the quality of fuel are compensated for by adjustments in the rate at which the grate travels in accordance with the amount of ash in the bed. The stoker is designed to feed either coal or bark through rotors, with supplemental fuel spouts over the rotors. Only bark passing through a vibrating screen with two-inch openings is fed to the rotors, all oversize material being diverted to the chutes from which it is fed directly onto the grates. The speed of the rotor feeding bark is naturally much higher than that required for feeding coal; hence, it is not practical to feed both coal and bark simultaneously through the same feeders. 12 illustrations. E.S.

GLYCERIN

LESSER, MILTON A. The role of glycerine in the printing industry. Graphic Arts Monthly 21, no. 3: 14, 16, 18, 20, 100 (March, 1949).

The author discusses the ways in which the graphic arts industry uses several million pounds of glycerin annually, such as in the production of rollers, inks, and plates, in collotype printing, static elimination, etc. 11 references. R.R.

GROUNDWOOD MILLS

CLARK, S. Groundwood mill and screen room heating and ventilation. Pulp Paper Mag. Can. 50, no. 3: 192-4, 200 (Convention, 1949).

The author describes the principles and details of the heating and ventilating systems installed by Ross Engineering of Canada in the groundwood mill and screen room of the Thunder Bay Paper Co. Ltd. at Port Arthur, Ont. The installation was designed to accomplish the following: complete grinder exhaust which eliminates steaming both on the charging floor where the magazines are loaded and on the grinding floor; a screen room exhaust

over the three Oliver filters; an exhaust over the bull screen; cooling air for five 5000-h.p. electric motors; and grinder and screen room heating and ventilating (not air conditioning). The grinder and screen rooms have been constructed without windows. An automatic temperature control system was supplied by Foxboro. E.S.

GROUNDWOOD PULP

Brecht, Walter. Developments. Das Papier 2, no. 23/24: 437-42 (December, 1948). [In German]

The author reviews some phases of the work on wood grinding and groundwood pulps carried out at Darmstadt and supplies additional data (not previously published) covering the development of special groundwood pulps. One procedure involves the use of a special pulpstone and burring method with which, on a laboratory scale at the institute at Darmstadt, reproducible groundwood pulps have been obtained from which newsprint could be made without the addition of chemical pulps. The strength properties of this paper were superior in every respect to newsprint prepared from a conventional furnish consisting of 80% groundwood and 20% sulfite. The main reason for this improvement is the increase in the long-fibered fraction of the pulp. The application on a mill scale was prevented by war and postwar conditions, particularly by the lack of large pulpstones of the type required. However, certain improvements without such pulpstones are possible by means of auxiliary machinery, which Voith has now installed in one German mill. Results have not yet been obtained over a sufficiently long period to allow definite conclusions to be drawn. However, the long-fibered fraction of the ground pulp has been increased from 10 to about 25%, permitting a reduction of chemical pulp from 17 to 9.5%. Reference is made to the wet-strength tester previously described (*cf.* B.I.P.C. 17: 574-5; 18: 254-5). When applied to groundwood printing papers, it was found that the machine produced broke when the breaking load fell below 70-80 grams. It was further found that, when two groundwood pulps with quite different wet tensile strengths were mixed, the strength value of the resulting mixture was quite different from that expected from calculations. For instance, a fine groundwood pulp (I) had an initial wet tensile strength of 50, a coarse pulp (II) a value of only 20. When the two were mixed in the ratio of 75% (I) and 25% (II), the wet tensile strength of the mixture rose to 110. When (I) predominated, the resulting initial wet tensile strength was far above the calculated value, and below it when (II) formed the main portion of the furnish. Hence, a predetermined mixture of two groundwood pulps, which differ distinctly in their initial wet tensile strengths, will result in a much higher wet strength of the mixture than corresponds to that of each component. A patented mill procedure is based upon this mixing method. Grinding is carried out as usual; screening not only removes the tailings, but divides the pulp into two different portions, one with the characteristics of (I) and the other with those of (II). Both are tested for their initial wet tensile strength and mixed in the ratio to give the tensile strength required by the paper machine upon which the pulp is run. In repeated mill experiments, newsprint of 50-gram basis weight has been run upon a paper machine, 3.60 m. in width, without the addition of chemical pulp. Broke on the machine was not higher than usual and no printing difficulties were experienced on the presses. The quality of the wood and pulp, as well as the machine speed, were identical with those usually employed. In conclusion, the possibilities of a combination of these two methods are mentioned. E.S.

Perry, Henry J. Problems of small groundwood mills. Pulp Paper Mag. Can. 50, no. 3: 229-31 (Convention, 1949).

The author discusses the possibilities of cost reduction and quality control in the small groundwood mill to meet the gradually returning competition. He analyzes the various places where savings can be made and quality can be improved, including grinders, pressure systems, cylinders on pocket grinders, cylinder valves, pulpstones, lathes, temperature control, screens, and deckers and wet machines. Present tests for quality control are reviewed; each system must be adapted to the mill using it, bearing in mind that it cannot be a costly luxury but must pay its way in savings. The variations of grinding rate, power input, stone condition, temperature, and pressure, as well as the quantity of screen rejects, are indicators of quality. Physical tests include color and dirt count, freeness, actual qualities of hand sheets, bulk number, and fiber classification. E.S.

HISTORY

BILLINGER, R. D. Early Pennsylvania paper making. J. Chem. Education 26, no. 3: 154-8, 162 (March, 1949).

A historical account is given of the development of the paper industry in Pennsylvania, starting with William Rittenhouse, who built the first paper mill in America on the banks of the Wissahickon Creek near Philadelphia. The second mill was erected by DeWees in Crefeld; the third enterprise was known as Ivy Mills, built by Thomas Wilcox in Concord; and the fourth paper mill was at Ephrata, erected by a group of First-Day German Baptists, now called Dunkers. Detailed data about the fate of these mills and their owners are given. By 1770, there were 40 paper mills in the states of Pennsylvania, New Jersey, and Delaware; by 1810, there were 60 mills in Pennsylvania alone. Later developments in the papermaking field in the state are described, including the first soda wood-pulp mill (Warren Mill) operated by Burgess in Maylandville in 1855, and the invention of the sulfite process by B. C. Tilghman, a Philadelphia chemist. Pennsylvania continues to play an important part in the industry, still being among the first three states as regards number of firms and mills engaged in paper manufacture. However, the capacities of the newer western and southern mills are so much greater that this figure does not give a true picture of the industry as a whole. 4 illustrations and 13 references. E.S.

BOCKWITZ, HANS H. Henri Alibaux as paper historian, 1872-1941. Wochbl. Papierfabr. 77, no. 1: 17-18 (January, 1949). [In German]

The extensive work of the French paper historian Henri Alibaux is reviewed and a list of his publications is appended. Several manuscripts which he left at the time of his death are planned for publication. E.S.

KOTTE, HANS. The 150th birthday of the paper machine; the granting of the first patent covering the paper machine on January 18, 1799. Das Papier 3, no. 1/2: 14-21 (January, 1949). [In German]

After a brief introduction outlining the work of the old papermakers, the life of Nicholas-Louis Robert and his invention of the first paper machine are described; reference is made to the important improvements which Donkin added. In conclusion, the introduction of the paper machine into Germany is recorded. The first machine ordered from Donkin was erected in the Dillingen mill in the Rhineland in 1817; the machine was in full operation in January, 1818. In general, it seems that the German papermakers were slow in adopting the new machine. As late as 1840, there were still more than

1200 vats in operation in the country, whereas the number of paper machines amounted to less than 25. E.S.

HOUSES, PREFABRICATED

LEE, DOUGLAS H. The Forestville housing project; introducing a new type of prefabricated houses. Pulp Paper Mag. Can. 50, no. 3: 264, 266, 268, 270, 272, 274, 278 (Convention, 1949).

The extensive building program at Forestville, Que., on the north shore of the St. Lawrence River by the Anglo-Canadian Pulp and Paper Mills Ltd. is described; it has been carried out for the twofold purpose of housing the company's woodlands employees and, at the same time, cutting down the previous large labor turnover. Fifty prefabricated houses have been erected to date. The advantages and disadvantages of these units are discussed, as well as the problems which may be encountered in conveying the units to the building sites. In summing up the merits of prefabricated housing, it is stated that the prefabricated houses were superior in every respect to the conventionally built houses erected the previous year. They are obviously very solid and sound in construction. They are relatively cheap, considering present construction costs. Each completed unit will not greatly exceed the estimated cost of $7000. Naturally, they do not afford the individuality offered by conventional building and desired by many clients. E.S.

INSTRUMENTATION

MURPHY, E. A. Engineered washer instrumentation contributes to maximum chemical recovery. Paper Trade J. 128, no. 10: 21-5 (March 10, 1949); *cf.* B.I.P.C. 19: 397-8.

The author discusses complete washer instrumentation under the headings: consistency control, blow tank heat recovery, stock flow to washers, temperatures of wash water and first-stage liquor, flows of wash water and liquor, liquor flow to evaporator storage, liquor level in storage tanks, Baumé of first-stage liquors, pulp-slurry levels in washer vats, sheet-thickness recorders on washer drums, and purging systems to prevent clogging by stock or liquor. Four diagrams are included. The variety of industrial instruments now available and the numerous ways in which these instruments can be employed make it possible to engineer a system of instrumentation capable of meeting the requirements of any pulp-washing system. E.S.

KRAFT PULP AND PAPER

EVERY, DERNELL. Review and outlook for unbleached kraft paper. Paper Trade J. 128, no. 8: 93, 98 (Feb. 24, 1949); Paper Mill News 72, no. 9: 124, 163 (Feb. 26, 1949); Paper Ind. 30, no. 12: 1826-7 (March, 1949); Paper & Twine J. 22, no. 12: 18, 20, 23 (February, 1949); Southern Pulp Paper Manuf. 12, no. 3: 32, 34 (March, 1949); Am. Paper Converter 23, no. 3: 16-17 (March, 1949); Am. Paper Merchant 46, no. 4: 26, 29 (April, 1949); *cf.* B.I.P.C. 18: 519.

The annual production of unbleached kraft paper during 1948 amounted to about 2,200,000 tons, approximately 10% more than in the previous year. The majority of professional forecasters seem to anticipate a lower average rate of operation in most lines of business during 1949, which should have a direct effect on kraft paper, a service commodity. However, there is no need to be pessimistic about the prospects of the industry, because wrapping

paper, bags, shipping sacks, and envelopes will still be in heavy demand. In 1948, the industry operated at 95% of its capacity. The production ratio in 1949 will probably not exceed this figure; with slightly increased capacity, the identical ratio would still result in a higher production. E.S.

LIGNIN

ADLER, E., and ELLMER, L. Coniferyl aldehyde groups in wood and isolated lignin preparations. Acta Chem. Scand. 2, no. 9: 839-40 (1948). [In German]

It was indirectly shown earlier (*cf.* B.I.P.C. 19: 165) that the color reaction of wood with phenols and aromatic amines is the result of the presence of coniferyl aldehyde groups. Hadromal obtained by extracting wood with stannous chloride gives color reactions with phloroglucinol and with *p*-aminobenzoic acid identical with those obtained with wood. On treatment of hadromal with 2,4-dinitrophenylhydrazine, coniferyl aldehyde 2,4-dinitrophenylhydrazone is obtained, proving the presence of (about 0.02%) coniferyl aldehyde in addition to (0.05%) vanillin in wood. The actual coniferyl aldehyde content of the wood may be about 0.5-0.75%, or about one group per 40-60 phenylpropane building stones. In isolated native lignin one coniferyl aldehyde group is present for about each 40 methoxyl groups. Lignosulfonic acid isolated by dialysis from a spent liquor of a hard cook contains one coniferyl aldehyde group for each 50 methoxyl groups. In addition to these aldehyde groups, lignin contains still other carbonyl groups. By treatment of isolated native lignin with hydroxylamine hydrochloride and potentiometric titration, one carbonyl group is found for each 8 methoxyl groups. F.E.B.

HOLMBERG, BROR. Lignin. XVI. Sprucewood and thiohydracrylic acid. Arkiv Kemi, Mineral. Geol. 21 A., no. 10: 20 p. (1945). [In German] *cf.* B.I.P.C. 14: 52-4; 19: 480.

Thiohydracrylic acid (I) was used in the place of thioglycolic acid (II) for the isolation of lignin from sprucewood by two different methods. In method A, 11.1 g. wood was treated with 50 cc. 2 *N* hydrochloric acid and 6 g. (I) for one month at room temperature or for four hours on a water bath. In method B, 50 cc. (I) and 5 cc. 2 *N* hydrochloric acid were used. Similar lignothiohydracrylic acids were obtained by the two methods. (I) reacts with spruce lignin in the same way as (II). F.E.B.

MÜLLER, OLAV. Chemistry of beechwood. IV. Changes of native beech lignin during its isolation. Chem. Ber. 81, no. 2: 97-101 (March, 1948). [In German] *cf.* B.I.P.C. 18: 499-500.

In part III of this series it was shown that, in the formation of native lignin, an alkoxylated hexosan takes part to the extent of 30-40% of the lignin determined with sulfuric acid. During the conversion of native lignin into Klason lignin, methoxyl groups are split off. Because cuoxam lignin is prepared under particularly mild conditions, the effect of 64%, 72%, and 75% sulfuric acid and of chlorine dioxide on cuoxam beech lignin (I) was studied. (I) loses 10% of its weight with sulfuric acid. Of this amount, 7.8% is reducing sugars. The methoxyl content remains practically unchanged (20.6-21%). The portion of lignin resistant to chlorine dioxide yields upon hydrolysis 7.2% reducing substances (on the basis of the lignin). Halse beech lignins prepared with 36%, 37.2%, and 38% hydrochloric acid contained 45%, 17.9%, and 1% of a residue resistant to chlorine dioxide, indicating that the first two samples are incompletely saccharified. From these results the author concludes that (I) is more closely related to sulfuric acid lignin than to native lignin. 16 references. F.E.B.

REGESTAD, SIXTEN OLOF, and SAMUELSON, OLOF. The neutralization curves of high molecular sulphonic acids. Svensk Kem. Tid. 61, no. 1: 8-10 (January, 1949). [In English]

The titration curves of purified lignosulfonic acids (I) show that these acids have a considerable buffering capacity between pH 5 and 8, from which it is concluded that (I) contain some carboxyl groups. It was further found that not all the sulfur in (I) is present as sulfonic acid groups. Cellulose ethanesulfonic acid shows a titration curve very similar to that of hydrochloric acid, indicating that there is no difference between the potentiometric titration curves of soluble high molecular and insoluble high and low molecular (I). F.E.B.

RICHTZENHAIN, HERMANN. Enzymatic experiments dealing with the formation of lignin. III. The dehydrogenation of 5-allylpyrogallol 1,3-dimethyl ether. Chem. Ber. 81, no. 3: 260-5 (May, 1948). [In German] *cf.* B.I.P.C. 16: 549.

In model experiments on the formation of lignin, 5-allylpyrogallol 1,3-dimethyl ether (I) was enzymatically oxidized with oxygen in the presence of a mushroom ferment, giving a dehydrogenation product of the composition $(C_{22}H_{24}O_7)_x$. About 50% of the phenolic hydroxyl groups disappeared as the result of etherification. After methylation and oxidation, trimethylgallic acid, 3,4,5-trimethoxyphthalic acid, and 2,6-dimethoxy-4-carboxyphenoxyacetic acid were obtained. The results indicate that, on dehydrogenation of (I), linkages are formed which are also found in lignin. 10 references. F.E.B.

RUSSELL, ALFRED, BAITY, JOHN H., and SMITH, HERBERT E. Interpretation of lignin. III. The synthesis and polymerization of stable monomers. J. Am. Chem. Soc. 71, no. 3: 956-7 (March, 1949); *cf.* B.I.P.C. 19: 90.

To investigate further the polymerization reaction used in the synthesis of lignin-like materials, three stabilized monomeric units—2,4-dihydroxy-3-formylacetophenone, 2,6-dihydroxy-3-formylacetophenone, and 2,4,6-trihydroxy-3-formylacetophenone have been prepared and separately polymerized. E.S.

LIME AND LIMESTONE

GIBBS, RALPH. What size rotary kiln? Paper Ind. 30, no. 11: 1614-15 (February, 1949).

The most economical size of rotary lime kiln will be determined by such factors as first cost, maintenance, power and fuel consumption, etc. A formula is given relating the size of the kiln to its normal production rate, from which it is seen that the production rate is proportional to the volume of the kiln. If the kiln is somewhere between 15 and 30 times the diameter in length, it is assumed to be economically proportional. For ordinary calcining operations it seems that the length of the kiln should be proportioned to its square rather than to its simple diameter. A diagram is given showing the relation of kiln dimensions to throughput. R.R.

LUBRICATION AND LUBRICANTS

ENKVIST, TERJE, ASIKAINEN, PENTTI, PRIHA, ERKKI, and PAERSCH, HENRIK. Lubricating oil from wood tar and tall oil. 4. Cooks with tar from pine stumps in the presence of catalysts.

Finnish Paper Timber J. 31, no. 3: 44-7; no. 4: 61-8, 75 (Feb. 15, 28, 1949). [In Swedish; English summary]

Experimental cooks with tar from pine stumps (about 0.3-10 kg. in each case) in the presence of different catalysts for the preparation of lubricating oil are described. The addition of catalysts improved the decarboxylation of the resin acids, thereby leading to the formation of lubricating oils which consisted chiefly of hydrocarbons. Ferrous and nonferrous catalysts were used. The individual cooks are discussed in detail and the results are given in nine tables. The best results were obtained by adding 1.8% calcium carbonate and 1% iron powder to the tar, heating the mixture for about two hours at 300° C., distilling off the lubricating oil with superheated steam at ordinary pressure, and subjecting the distillate to fractionated cooling. The lubricating-oil distillate is finally washed with 4% caustic soda at about 90° C. The low-boiling fractions of the tar collect as distillate on heating the tar up to and at 300° C. If the distillation is carried out without steam at ordinary or reduced pressure, solid retene will precipitate from the lubricating-oil distillate on standing. The ferrous catalysis can also be brought about by first adding the lime in the form of 1.8% calcium carbonate to the tar and then causing the mixture to flow over iron turnings at 150° C. until about 1% of the iron has dissolved, and finally heating the mixture for about two hours at 300° C. The second method was used successfully on a technical scale in four Finnish plants during the years 1944-46 and played an important role in helping the country through her most critical period of lubricating-oil shortage. A ferrous salt of tall oil pitch is also a very satisfactory catalyst, in that it readily penetrates into the tar and is effective in converting even the pitch substance of tall oil into lubricating oil. 22 references. E.S.

MACHINERY

CLARK, CARLETON. Wet end water removal. Paper Ind. 30, no. 11: 1615-17 (February, 1949).

The author considers the factors involved in removing water from the wet end of a paper machine, discussing suction boxes, the prevention of flooding, vacuum control, piping and separators, suction couches, the proper size of vacuum pumps, the moisture content of the sheet entering the driers, and cylinder machines. The vacuum and separator system for Fourdrinier flat boxes is shown in a diagram. R.R.

MDS. Open house at J. M. Voith, Heidenheim. Wochbl. Papierfabr. 77, no. 2: 41-2 (February, 1949). [In German]

J. M. Voith held an open house in December, 1948, to show to the technical press and its own employees and their families the plant and the machinery under construction or partially assembled. The items of special interest included a complete paper machine for medium-fine printing and writing papers for the Papeteries du Souche in France, a horizontal double press for a Swiss mill, and two continuous grinders for Holmens Bruks in Sweden. E.S.

MACHINERY—BOARD MACHINES

SPRINKLE, A. E. First modern felt machine. Paper Mill News 72, no. 12: 8-9 (March 19, 1949).

An illustrated description of the cylinder machine is given, which has been installed in the new Cedarhurst, Md., plant of Congoleum-Nairn, Inc. The machine is equipped with the Goldsmith vacuum Stream-Flow vat system, manufactured by the Pusey & Jones Corp., and produces single-ply high-gage sheets used for flooring felt. E.S.

MACHINERY—CHIPPERS

MURTO, JAAKKO O., and KIVIMAA, EERO. The chipping of pulpwood. II. Finnish Paper Timber J. 30, no. 21: 383-93 (Nov. 15, 1948); C. A. 43, no. 4: 1566 (Feb. 25, 1949). [In Finnish; English summary. Abstract in English] The State Institute for Technical Research, publication 9. Helsinki, 1949. 25 p. [In English] *cf.* B.I.P.C. 18: 361.

Pulpwood was chipped with a laboratory chipper with four blades of 58-60 Rockwell hardness, with 20, 30, 40, and 50° cutting angles, the chipping rate being 6 cm./min. The chipping angle was adjustable to 30, 40, 50, and 60°. The loss in blade sharpness on water-transported pine was 25% in eight hours. The thickness of chip increased with increasing cutting angle and wood moisture; chipping fines and chipping work decreased with moisture and increased with blade cutting angle. Moisture had little effect on chip damage, which increased with increasing cutting angle. Chip thickness increased to a maximum of 5 mm. at 20° and 30% moisture, and fell off slightly at 43% moisture. At −20° the curve was in the reverse order, chip thickness being high at 20° and 43% moisture and falling to a minimum at 33%. Temperature has relatively little effect on chipping fines and chipping work. Increasing length of chip caused an increase in chip thickness and sharp decreases in fines, work, and chip damage. The chipping angle had little effect on chip thickness, but increasing the chipping angle caused slight increases in fines, work, and chip damage. E.S.

MACHINERY—CONVERTING MACHINERY

ANON. Porter's partition assembler perfected. Fibre Containers 34, no. 2: 41-2, 44 (February, 1949).

An illustrated description is given of the current model of Porter's partition assembler, which operates on the windmill plan to assemble 12, 24, 36, or 48 complete A, B, or C flute corrugated partitions per minute of as many as 24 cells. The machine requires three people to handle 48 assemblies per hour; up to 14 are required to do a similar amount of work by hand. The J. H. Mayhew Co., Minneapolis, Minn., is manufacturing the equipment. R.R.

MACHINERY—CONVEYORS

MOON, C. L. Conveyors—the arteries of production. Paper Trade J. 128, no. 8: 69-71 (Feb. 24, 1949).

The first commercial use of conveyors occurred in 1880 in connection with grain elevators, followed by the handling of bulk materials in other operations. The next step was the handling of packaged materials and individual parts within the plant, and the use of conveyors in lumber yards and brick plants. Different types were developed for these various purposes. The first important application to a manufacturing operation was made by Henry Ford about 1912 or 1913, when he installed the first conveyorized assembly line. From that point forward, the science of conveyors has marched side by side with the over-all development of mass production techniques. Examples of applications and further possibilities are mentioned. E.S.

MACHINERY—CURLATOR

HILL, H. S., EDWARDS, J., and BEATH, L. R. Curlated pulp—a new approach to pulp processing. Pulp Paper Mag. Can. 50, no. 3: 153-60, 191 (Convention, 1949); Paper Ind. 30, no. 11: 1658-64 (February, 1949); Paper Trade J. 128, no. 11: 19-27 (March 17,

1949); Paper Mill News 72, no. 13: 30-2, 34-8, 56 (March 26, 1949); Pulp and Paper 23, no. 4: 88, 100-1 (April, 1949).

A permanent change in the shape of pulp fibers is obtained by causing nodules of high consistency pulp to roll in changing directions between two surfaces which compress the nodules while they roll. The change in shape is toward more bends, kinks, and twists and a more tubular cross section. The manipulation also exerts a powerful deshiving action. The process causes a change in all pulp properties and, although there are many degrees and variations, the effect in general is toward a softer pulp and, thus, is somewhat opposite from the effect of beating. Freeness tends to rise. In appearance, sheets of the treated pulp have a more even-textured, mat look. The effect of the process is in evidence when applied at any degree of beating and, to some extent, persists through subsequent beating. The process resembles that of drying in its effect on strength properties but differs for stretch, drying tending to lower stretch and the process to increase it strongly. The process widens the range of quality obtainable from a given pulp, and also permits entirely new combinations of pulp properties, thus indicating a wide variety of possible applications. Among other things, it may permit a higher pulp yield for many conversions. E.S.

SILVER, FRANK P. "The curlator," its application to high yield newsprint sulphite: preliminary report. Pulp Paper Mag. Can. 50, no. 3: 195-200 (Convention, 1949); Paper Ind. 30, no. 11: 1664-8 (February, 1949); Paper Trade J. 128, no. 9: 17-22 (March 3, 1949); Pulp and Paper 23, no. 4: 101-3 (April, 1949).

The Curlator, a radically new type of pulp processing equipment, is described. An account is given of its first commercial trial, which was in a hookup in a newsprint sulfite system to permit an increase in pulp yield. The Curlator was put on the screen rejects in a closed system, and the digester yield was increased in steps until the amount of rejects reached the full capacity of the Curlator to treat them properly. About a 10% increase in yield was obtained, with practically all the digester yield acceptable for newsprint. The results were entirely satisfactory from operating and quality standpoints, and the equipment and method were thoroughly proven during eight months of steady operation. The Curlator treated 30-45 tons of screen rejects per day at 1 to 1½ h.p./airdry ton. On the basis of the present trial, materially higher yields are envisioned, with Curlators treating the whole sulfite stock. E.S.

MACHINERY—DRIVE, ELECTRIC

SPENCER-PHILLIPS, R. J. Harland sectional electric drive as applied to paper machines. Pulp Paper Mag. Can. 50, no. 3: 142-8, 152 (Convention, 1949).

The author describes the essential requirements of a sectional electric drive and explains the method utilized in the "Harland Drive" for obtaining: (1) a signal of any speed error, (2) a constant speed reference, and (3) means for converting the signal thus obtained to give the maximum sensitivity to the drive. The system of tension control for the reel section is explained and also the means for obtaining adjustment of "draw" between different sections. The question of starting and accelerating each individual section is discussed, together with the type of generating equipment found to be the most desirable for different types of paper machines. An explanation is given of the method for providing "creeping" when it is required. Finally, a vision of the future is outlined. E.S.

MACHINERY—ELECTRIC EQUIPMENT

ERICHSEN, ERIK. The economic construction and maintenance of electrical installations in a pulp and paper mill. Norsk Skogind. 3, no. 1: 12-23 (January, 1949). [In Norwegian; English summary]

The author gives an account of the possibilities of the Norwegian pulp and paper mills to cover their power requirements by electrical energy. A survey is given of the hydroelectric plants under construction, which are expected to be in operation by 1953-54. The possibility of exporting surplus power to Sweden is considered. The high- and low-voltage installations of a pulp and paper mill are described, with emphasis on the benefits to be derived from the standardization of equipment and individual parts. The importance of a filing system and up-to-date files with records of the performance and maintenance cost of each piece of equipment is emphasized, as well as the keeping of a continuous control system for determining the power consumption by the individual units (groundwood mill, pulp mill, and paper mill). E.S.

MACHINERY—MIXING APPARATUS

SMITH, JULIAN C. Agitators for liquids: modern processing requires effective equipment. Chem. Inds. 64, no. 3: 399-404 (March, 1949).

The author discusses the more common mechanical agitators used for mixing liquids in vessels, including propellers, paddles, gates, anchors, turbines, radial propellers, cones, and disks, and several of the special types. Impellers and devices for changing the flow pattern of the liquid are described and the selection of the proper agitator is discussed. The vessel used should be regular in shape, preferably cylindrical with a dished-out bottom; the liquid depth usually approximates the tank diameter. A list is appended of the names and addresses of companies manufacturing the kinds of agitators discussed. Illustrations supplement the text. 11 references. R.R.

MACHINERY—PACKAGING MACHINERY

TRIANGLE PACKAGE MACHINERY COMPANY, *Chicago.* New machine wraps lettuce for less cost than shrinkage loss on unwrapped heads. Packaging Parade 17, no. 194: 40-1 (March, 1949).

A machine has been developed for automatically wrapping lettuce heads in cellophane, heat sealing the wrap with a projecting tab for price and brand label, and trimming off the excess material. Test sales of lettuce so wrapped indicated a good reception from both customers and retailers. A cost chart shows that the shrinkage loss (estimated at 10%) is greater than the total cost of wrapping. The total loss of unwrapped lettuce from shrinkage, labor to recondition the heads while on display, and garbage disposal at the retail level amounts to 2.5 cents per head. For wrapped lettuce, the loss from garbage disposal at the wholesale level, labor, material, overhead, current, and amortization of the wrapping machine amounts to 1.5 cents per head. A sketch shows a typical production line arrangement for trimming, wrapping, and crating; illustrations are given of the machine, which will handle 24 heads per minute. R.R.

MACHINERY—PRINTING MACHINE

MALCOLMSON, J. D. New carton gravure. Modern Packaging 22, no. 7: 94-6 (March, 1949); *cf.* B.I.P.C. 19: 482-3.

Recent technical achievements have adapted the Intaprint process to printing on boxboard at low cost. New presses print folding cartons by the sheet-fed gravure method and make economic short runs possible. The presses use interchangeable printing plates which are prepared almost photographically with little if any retouching and halftone screens much finer than it was heretofore possible to use on folding carton stock; register and make-ready problems are virtually eliminated. The new process actually combines the best qualities of photoengraving, offset, and intaglio printing; it uses a volatile ink which dries instantly and permits very high speeds. A description of the Intaprint operations is given. An attached sample of the printing shows brilliance, depth, and gradation of color which may be obtained on any good quality board. R.R.

MATERIALS HANDLING

ANON. Novel wood handling system. Pulp & Paper 23, no. 3: 98, 101, 102 (March, 1949).

An illustrated description is given of the wood extraction process at the new Oakdale, La., plant of Newport Industries, Inc. A Lorain crane is used to unload the stump wood and feed it to the steel Link-Belt chain conveyor. Each step in the preparation of the wood is housed in a separate structure, all erected in a straight line. Conveyors bring the material to the top of each building and pick it up again at a lower level after it has been processed. This arrangement results in good light and ventilation and minimizes the fire hazard. R.R.

HALL, D. D. Material handling in specialty paper mills. Pulp Paper Mag. Can. 50, no. 3: 204-6 (Convention, 1949).

Management of paper mills is becoming increasingly conscious of the fact that 8-10% of its payroll go for material handling, an amount which does not contribute to the conversion of wood to paper but is spent simply on moving material around. The usual method of systematically investigating the best way to introduce mechanized handling is to have a survey made by industrial engineers and time-study men to ascertain the unit cost of each phase of each move. Recommendations for altering the present procedures or the purchase of mechanical equipment generally follow. The author reviews the different types of equipment used for pulp transport from sulfite or groundwood mill to the specialty mill, and for transporting lapped pulp within mill storage areas under different conditions. Bagged materials and drums can be handled by devices similar to those used for lapped pulp. Broke and finished products handling also receive consideration. In conclusion, the fact is emphasized that mill handling costs should not be hidden in the general mill operating costs, but should be shown separately, thereby providing the means for controlling them. E.S.

MATERIALS OF CONSTRUCTION

ROGERS, F. W. The potentialities of aluminum and its alloys for the paper-making industry. Paper-Maker (London) 117, no. 2: 104, 106, 108-13 (February, 1949).

The chief purpose of this paper is to indicate the potentialities of aluminum and its alloys for the papermaking industry. The properties and behavior of these materials are described briefly, but in sufficient detail to assist their selection according to the conditions of service. The more usual working methods are surveyed, with particular reference to those applicable by the plant maintenance engineer. The value of close co-operation between the industrial user of aluminum and its producer is emphasized. Some typical

applications of aluminum to industry are listed (road and rail transport, aircraft, marine service, mining equipment, food preparation and handling, electrical apparatus, architecture and building, etc.) and suggestions are offered for possible applications to papermaking (for reducing weight in wood-handling equipment, paper-machine hoods, table rolls, roller guides, and auxiliary machinery, such as sizing troughs, color tubs, drying racks, storage tanks, etc.). E.S.

MICROSCOPY (ELECTRON)

FREY-WYSSLING, A., MÜHLETHALER, K., and WYCKOFF, R. W. G. The microfibrillar structure of plant walls. Experientia 4, no. 12: 475-6 (December, 1948). [In German; English summary]

Using a suitable method of comminution and Williams and Wyckoff's metal shadow-casting technique (*cf.* B.I.P.C. 16: 291-2), a number of electron microphotographs of plant cell walls were prepared, of which four are reproduced. In this manner it was possible to obtain a beautiful picture of the fibrillar structure of the primary and secondary cell walls. The microfibrils of the primary wall form an interwoven pattern, whereas those of the secondary wall are parallel and yield a much denser structure. The fibrils of both walls are of equal thickness, their diameter (including cell walls from many plants and cultures of cellulose-forming bacteria) being remarkably constant (250-300 A.). E.S.

PETERI, R. Possibilities in the use of the electron microscope in studying paper and pulp. Bull. assoc. tech. ind. papetière 3, no. 1: 12-22 (February, 1949). [In French]

The author discusses the possibilities and limitations of the electron microscope and reviews a number of studies dealing with the microstructure of fibers. 31 references. L.E.W.

SIEGEL, BENJAMIN M. The structure of cellulose in the electron microscope range. Tappi 32, no. 3: 109-12; discussion: 112-16 (March, 1949).

The author reviews and evaluates briefly some of the most recent work done on cellulose with the electron microscope employing the shadow-casting technique, notably the researches of Mühlethaler and Wyckoff of the National Institute of Health (data not yet published), who prepared their specimens by beating in a Waring Blendor and shadow-casting with palladium, and the studies of Kinsinger and Hock (*cf.* B.I.P.C. 19: 96-7) of the Hercules Experiment Station, who used chromium for shadow-casting. Brief reference is also made to the effect of sonic disintegration on cellulose fibers. These investigations illustrate the usefulness of the electron microscope for the study of the intermediate size range in the order of 100 A. E.S.

MILL CONTROL

ARLEDTER, HANNS. Technical and scientific control of operations in the paper industry. Das Papier 2, no. 21/22: 401-5; no. 23/24: 448-51 (November, December, 1948). [In German]

The following are discussed: importance and functions of control methods, the organization of a paper-mill laboratory, scientific and routine control of operations, control of raw materials and halfstuffs, mill control in the beater room, and the regular testing of the finished paper. The last subject is treated in greatest detail, with special reference to general properties of the sheet (basis weight, thickness, volumetric weight, moisture, ash, dimensional

stability, optical heterogeneity or homogeneity, and color), strength properties, special properties (like gloss, smoothness, pick resistance, surface properties, size resistance, air permeability, transparency and opacity, and stiffness and softness), and chemical properties (such as pH, fading and yellowing, retention of beater additives, etc.). L.E.W.

MILL MANAGEMENT

TIDLAND, BART L. Job evaluation. Paper Mill News 72, no. 12: 22, 27 (March 19, 1949).

The prime reason for a job-evaluation failure is not particularly the specific plan used but rather the lack of understanding of what the plan is designed to do and the method of installing the plan. Job evaluation was never designed to create a general increase in wages, a fact most often misunderstood. The successful installation of job evaluation in the two plants of the Rogers Corp., Conn., is described. The desire for an evaluation came from the local union having jurisdiction over the plants. The work was carried out by a joint committee, consisting of two members of management and two representatives of each of the two plants, the author and his assistant working with them during the original evaluation. The perpetuity of the plan has been accomplished by the same joint plant committee. E.S.

VALLILLEE, JAMES E. Essentials of a sound industrial relations program. Pulp Paper Mag. Can. 50, no. 3: 129-31, 141 (Convention, 1949).

A 10-point program for improving industrial relations is outlined. E.S.

NEWSPRINT

AMERICAN NEWSPAPER PUBLISHERS ASSOCIATION. Newsprint consumption by states in 1948. Newsprint Service Bur. Bull. no. 374: 2 (March 14, 1949).

ANPA has compiled a table giving the newsprint consumption by states for the year 1948 based on reports received from 1352 daily newspapers which consumed 4,496,539 tons in 1948. New York State leads with 856,332 tons; Nevada with 1299 tons represents the lowest figure. E.S.

ZIMA, J. J. Newsprint paper in 1948. Paper Trade J. 128, no. 8: 94-8 (Feb. 24, 1949); Paper Mill News 72, no. 9: 104, 106, 108, 158-9 (Feb. 26, 1949); Paper Ind. 30, no. 12: 1822, 1824-6 (March, 1949); *cf.* B.I.P.C. 18: 532-4.

The output of the North American newsprint mills in 1948 amounted to 5,850,000 tons, nearly 4% more than in 1947, 11% more than in 1946, and 18% more than in 1937, the best prewar year. United States producers accounted for 14.8% of the continental record, Canadian mills for 78.7%, and Newfoundland mills for 6.5%. Exports from Canada amounted to 4,328,000 tons, a gain of 2.5% over 1947, of which 90.5% (3,917,000 tons) went to the United States, whereas the balance of 411,000 tons was shipped to overseas destinations, chiefly the United Kingdom, Australia, South Africa, Brazil, and New Zealand. Of the 4,393,000 tons imported into the United States, 89% came from Canada, 6% from Europe, and 5% from Newfoundland. The 1948 per capita figure of nearly 70.5 pounds was 4 pounds above that in 1947; it has been estimated that newsprint accounts for approximately 20% of the 1948 per capita use (357 pounds) of all kinds of paper and paperboard. Information on newspaper sizes, circulation, and advertising is also included, with reference to the possible effects of radio and television advertising. 3 diagrams and 5 tables. E.S.

PAPER—COATED

LANDES, C. G. TAPPI survey of paper coating; review of the literature for 1946. Tappi 32, no. 3: 121-8 (March, 1949).

The author discusses the literature on paper coating published in 1946. The subject matter is divided into three principal classifications, as follows: coating for printing papers, consisting usually of pigment-adhesive coatings in aqueous media; protective coatings composed largely of resins or other film-forming ingredients (solvent or aqueous vehicles may be present); and specialty and miscellaneous coatings. For convenience the material is also divided into subdivisions such as pigments, adhesives, equipment, testing, and packaging. A numerical patent index and an author index are given. 193 references. E.S.

PAPER—MERCHANDISING

ANON. A century of paper merchandising. Am. Paper Merchant 45, no. 11: 21, 36; no. 12: 30 (November, December, 1948); 46, no. 1: 20-1; no. 2: 26, 34; no. 3: 25, 49 (January-March, 1949).

A history is given of the S. P. Richards Paper Co., Atlanta, Ga., from its beginning in October, 1848. The series of articles is based chiefly on a diary kept by one of the founders of the business and presents an interesting study of paper merchandising during the past 100 years. R.R.

PAPER—VISCO-ELASTICITY

RANCE, H. F. Some new studies in the strength properties of paper. World's Paper Trade Rev. 131, no. 3: Tech. Sup. 1-7; no. 7: Tech. Sup. 9-13 (Jan. 20, Feb. 17, 1949).

The author postulates that the conventional methods of strength testing are not only inadequate, but often give misleading information to the papermaker and user. The new rheological approach differs in two important respects from traditional approaches. It pays particular attention to the prerupture stress-strain characteristics, instead of concentrating merely upon rupture strength, and it emphasizes the importance of the time factor, both in the testing and usage of the materials. Until fairly recently, paper has not been seriously studied by the methods of rheology and even to date, there exist few appropriate references. After reviewing the pertinent researches by Gibbon (*cf.* B.I.P.C. 15: 215), Farebrother (*cf.* B.I.P.C. 16: 51-2), Steenberg and Ivarsson (*cf.* B.I.P.C. 17: 638; 18: 103, 246-7; 19: 255-6), and Mason (*cf.* B.I.P.C. 18: 534), the author refers briefly to a few of the more salient features of the work carried out in the laboratories of Wiggins, Teape and Co., with which he is connected. The rheological studies were originally started to obtain more information about the directional differences in paper, with particular reference to the old problem of dimensional stability under changing humidity. He discusses the first fairly crude arrangements for obtaining stress-strain diagrams for tensile loading, in which evidence of creep phenomena and apparent flow were obtained (a specially impressive demonstration being an experiment where a strip of paper broke under deloading); the development of a system of empirical strain analysis (the division of deformation under a given load being divided into three components: the elastic, the reversible plastic or delayed elastic, and the irreversible plastic components); the relation between plastic flow and wet expansion (prestraining of a paper strip reduces the wet expansion by an amount more or less proportional to the degree of permanent set which has been incorporated into the paper; the shrinkage of the wet

web is visualized as being caused by the twisting, coiling up, and kinking of all the fibers in the sheet (in the machine direction, the tensions prevent these effects, whereas in the cross-machine direction there is freedom for shrinkage); the use of a stress-strain curve for predicting the folding endurance of paper; and, finally, the relation between rupture and prerupture characteristics of paper. The author argues that the practical strength of paper is as much determined by its ability to stretch as by its ability to take the load, and gives practical examples to show that the usage behavior of a paper is almost invariably determined by a combination of strainability and stressability; there is a real continuity between the prerupture strain process and the rupture itself. In conclusion, he refers to two new stress-strain instruments, Steenberg's universal instrument (*cf.* B.I.P.C. 18: 542-3) which functions by electric control, and an instrument developed in the author's laboratory, which is similar to the Cambridge textile Extensometer and whose automatic control is based upon a pneumatically operated servomechanism. 10 references. E.S.

STEENBERG, BÖRJE. Behaviour of paper under stress and strain. Pulp Paper Mag. Can. 50, no. 3: 207-14, 220 (Convention, 1949).

By means of a series of new recording instruments the stress-strain behavior of paper has been studied under widely different conditions. The rate of strain has been varied by a factor of more than 10^6. In the most rapid experiments, the paper breaks within a millisecond. The slowest experiment requires several days. The behavior of paper in rapid and slow straining processes is different and so are the changes brought about in the material by the straining processes. This is shown, for example, by comparison of stress-strain curves for paper strained twice, first slowly and then rapidly and vice versa. The ultimate tensile strength increases very markedly in the rapid experiments, but the relative increase is also a function of the fiber composition of the paper. Extensibility is not affected very much by the rate of straining. From the stress-strain curves several properties of the paper may be evaluated—e.g., the initial and ultimate modulus of elasticity and thixotropic changes brought about by repeated cycles of straining. The plastic properties of the material are given by tracing apparent viscosity curves. The practical value of such information for judging the properties of, for instance, flongs is discussed. Special attention is given to stress-relaxation of paper under constant deformation. This property may be very different for different papers. Some papers strained rapidly (0.001 sec.) will, while held under constant strain, relax extremely slowly and never completely. Others, strained to the same extent, will dissipate the energy completely in as short a time as 0.01 second. In this connection experiments have been conducted to study the effect of draws in the paper machine on this and other paper properties, as well as the influence of relative humidity. The importance of the capability of paper to dissipate energy without undue stresses being built up and the relation between this property and the ease of tearing is discussed—especially for newsprint and bag paper. When a paper bag drops to the floor, the kinetic energy is partly transformed into heat by friction between the particles filling the bag and is partly taken up by the paper. In the latter case some energy is dissipated as heat by irreversible stretch and some is stored as potential energy. Further studies on the energy distribution for different cases are required. 14 references. E.S.

PAPER AND PULP INDUSTRY

ANON. Pulp and paper. Unasylva 2, no. 5: 262-73 (September-October, 1948).

World production of wood pulp in 1948 is estimated at a record 28.25 million tons. The chief features of the 1947-48 situation were the continuous production increase in North America, the uninterrupted exceedingly low production level in Europe and Asia, and the proposals for new pulp-manufacturing capacity in Latin America, the Pacific area, and parts of Asia. Lack of foreign exchange and inflationary prices are impeding a more rapid growth of world trade in pulp, although manufacturers realize the necessity of stabilizing market rates to avoid a drop in world consumption. Statistics are given on pulp and paper production in the United States, Canada, Newfoundland, the Scandinavian countries, and those in central and western Europe, the Mediterranean area, Latin America, Oceania, and south and east Asia. The international pulp trade is tending toward prewar patterns, although the relative scarcity of pulp from major European producers and the dollar shortages are limiting the further recovery of world trade. Statistical data are given regarding the pulp and paper trade in the United States, Canada, Europe, and Latin America, the newsprint trade, prices, and consumption. R.R.

ANON. Story of Australia's paper industry linked with British Columbia. Western Pulp and Paper 2, no. 3: 8-11 (March, 1949).

About 85% of the hardwood cut for the Boyer plant of Australian Newsprint Mills is *Eucalyptus regnans,* which can be used successfully for groundwood because the fibers are roughened when they are torn apart and thus add strength to the paper made from them. About 15% stringy bark (*E. ibliqua*) is also cut, which results in a suitable groundwood pulp and gives maximum forest utilization. The color of the pulp, which is otherwise darkened by the reaction product of the wood acids with iron, is improved by the elimination of iron wherever it might come into contact with the pulp and by treating the hot pulp with a zinc hydrosulfite solution. Production at the Boyer mill began in 1941. The annual output is now 31,500 tons; the expansion program under way is expected to increase the total to 80,000 tons annually by the end of 1950. The timber used must be ground at a higher pressure and with duller stones than is the Canadian practice. Another difference lies in the fact that the drainage rate of the Australian pulp is abnormally slow, necessitating modifications to the wet end of the machine. Because the wood comes from various locations and altitudes which affect the fiber texture, it must be sorted and fed to the mill in carefully controlled proportions. The finished paper contains about 80% eucalyptus and 20% sulfite pulp imported from British Columbia. The Associated Pulp and Paper Mills Ltd. produced its first paper at Burnie in 1938, but it was not until 1940 that it commercially produced paper pulp from Australian hardwoods. Today some grades of paper are 100% eucalyptus; the over-all percentage of imported fiber used is 5-6%. The 1946 output was 20,000 tons, of which 18,500 was from eucalyptus soda pulp. The current expansion program calls for the installation of two additional paper machines and should result in an annual output of 30,000 tons by the end of 1951. In addition to its printing, writing, bond, duplicating, blotting, and account-book papers, the company is planning to produce hardboard.
R.R.

DOBROW, MORRIS C. Another new high achieved by the paper industry. Paper Trade J. 128, no. 8: 57-60, 98 (Feb. 24, 1949); Paper Mill News 72, no. 9: 122, 157 (Feb. 26, 1949); Am. Paper Merchant 46, no. 4: 25, 45 (April, 1949); *cf.* B.I.P.C. 18: 534-5.

In 1948, total production of paper and paperboard reached 22,048,766 tons, an all-time record, 4% higher than in 1947, 63% higher than in 1939, and

83% higher than the average for 1935-1939. For the present, production has not only reached but has outstripped demand; moreover, capacity has outstripped the country's requirements for the immediate and nearby future. The capacity for the U. S. paper industry was about 23,240,000 tons at the end of 1948 and is expected to approximate 24,325,000 tons at the end of 1949. The additions in the current year will be largely in the packaging and wrapping fields. The seller's market for the paper industry and for industry generally in the United States has given way to a buyer's market, which is not abnormal in the industry. All have been expecting competition to return. Should the general volume of 1949 business be off by 5-7%, consumption requirements of domestic paper and paperboard are expected to be somewhat under 21,000,000 tons. However, the industry can look for an increased consumption of its products by an increasing number of consumers, the population being expected to exceed 150 millions at the beginning of the 50's. There is every reason to believe that the paper requirements of the country will be such as to occupy nearly all the existing paper machine capacity soon after the next decade begins. Hence, the long range prospect continues bright, although the waiting time for demand to catch up with present capacity may be painful. This intermediate period will probably not be of long duration. A chart depicting capacity and actual production of paper machines in the United States from 1917-1948, inclusive, is given, as well as tabulated data on capacity and production by main grades for 1939 and 1946-48. E.S.

EVEREST, D. C. "Cash register complex" a fallacy. Paper Trade J. 128, no. 8: 104, 106, 108, 110 (Feb. 24, 1948); Paper Mill News 72, no. 9: 70, 72, 74, 76, 157 (Feb. 26, 1949); Paper & Paper Products 90, no. 12: 1, 12-13; no. 13: 4, 19 (March 5, 20, 1949); Southern Pulp Paper Manuf. 12, no. 3: 34-6, 38 (March, 1949); Fibre Containers 34, no. 3: 96, 98, 100 (March, 1949); Shears 67, no. 675: 69-73 (March, 1949).

During the last 10 years, the nation seems to have developed a "cash-register" complex, expecting the intake of each day to be bigger than yesterday's and exhibiting a most pessimistic outlook if this is not always the case. If the economy of this country cannot withstand a slight falling off in business without going into a tailspin, the situation would be precarious, indeed. With reference to the chart "Consumption of paper and paperboard compared with population and national income," prepared by the Marathon Corp. (*cf.* B.I.P.C. 19: 490), the author emphasizes the basic stability of the industry and explains the reasons for his optimism for the outlook in 1949, which is based on the opportunities of the various branches of the paper industry (newsprint and advertising, wrapping paper, grocery bags, toilet, towel and tissue, cups, waxed paper, etc.) and of the paperboard industry. E.S.

EVEREST, D. CLARK. Make decisions—get action. Southern Pulp Paper Manuf. 12, no. 3: 62, 64-6 (March, 1949); Tappi 32, no. 3: 18A, 20A, 22A, 26A (March, 1949); Fibre Containers 34, no. 3: 31, 36 (March, 1949); Pulp Paper Mag. Can. 50, no. 4: 65-9 (March, 1949).

Referring briefly to an address presented 20 years ago before the Technical Section on the identical subject, the author analyzes the problems which confront the American pulp and paper industry and which seem to be the bottlenecks of the industry in the future; this should help to indicate the direction which future research work and development should take. The most important problems include the provision of the basic raw material

—wood—in adequate supply, a better and more complete utilization of the wood presently used, and the study of substitution of wood by annual plants, agricultural residues, etc., in combination with an economist and accountant. Suggestions for modes of attack are given. Reference is made to the greatly improved educational facilities of the industry and to the growth and usefulness of the Technical Association. Without claiming to have touched on all problems confronting the industry, the author emphasizes the need for immediate action on the most pressing ones. E.S.

FOWLER, ROBERT M. The pulp and paper industry in 1949. Pulp Paper Mag. Can. 50, no. 3: 106-10 (Convention issue, 1949).

In his fourth annual report, the president of the Canadian Pulp and Paper Association discusses the significant trends of the past year, with particular reference to the U. S. trade balance and diminishing overseas markets, and brief mention of the prospects for 1949. E.S.

JAHN, EDWIN C. Pulp and paper import prospects of Scandinavian timber. Wood 2, no. 2: 16-18, 41-3 (February, 1947).

The author discusses the status of the pulp and paper industry of Norway, Sweden, and Finland, operating practices, technical developments, pulp capacity and operation, and problems facing the industry, notably the fuel situation, but also shortages of woods labor, the forestry situation, and shortages of materials in addition to coal and pulpwood. E.S.

MARONNE, R. A. The development of the paper industry in India. Das Papier 2, no. 23/24: 462-4 (December, 1948). [In German]

The present status of the Indian paper industry and the problems connected with its expansion are discussed. E.S.

NEUBRECH, W. LE ROY. Annual review, pulp and paper, February, 1949. Paper Trade J. 128, no. 8: 112-14, 122 (Feb. 24, 1949).

The highlights of the main section of the annual review issue (February, 1949) of the Industry Report: Pulp, paper and board, are presented; most of the tabulated material and all diagrams of the original are omitted. E.S.

PAPER SALES. Where does all the paper go? Paper Sales 9, no. 3: 24, 48, 50-1 (March, 1949).

Two tables are given, one showing the sales of five important paper products in each of the states and in the District of Columbia and the other showing the percentage of paper consumption and of U. S. population for each state. The data show that areas which rank high in industry and population do not necessarily lead in paper consumption, and suggest that good paper selling may be an important consideration. R.R.

PORTER, OLIVER M. NSRB workings explained to paper manufacturers. Paper Mill News 72, no. 9: 113-14, 116 (Feb. 26, 1949); Southern Pulp Paper Manuf. 12, no. 3: 40, 42, 46 (March, 1949).

The policies of the National Security Resources Board are outlined. E.S.

ROLFSEN, R. The paper and board industry 1948. MICHELET, C. F. The chemical pulp industry 1948. LYLE, A. The mechanical wood pulp industry 1948. Norsk Skogind. 3, no. 1: 3-7 (January, 1949). [In Norwegian and English]

Conditions in the Norwegian pulp and paper industry during 1948 are reviewed. E.S.

STEVENSON, L. T. The growth of paper consumption. Paper Trade J. 128, no. 8: 54-5 (Feb. 24, 1949).

The consumption of paper and board per capita (production plus imports less exports, with the results divided by population) is an index of the relative prosperity of the United States economy; it moves up and down with every business cycle. The annual per capita consumption is shown in a table covering selected years from 1899 (57.9 pounds) to 1917 (118.5 pounds) and from then every year through 1948 (358.5 pounds). One chart illustrates the annual per capita consumption of paper and board since 1917, and another the consumption of paper and board, each plotted separately. The strikingly saw-toothed movement is immediately apparent, as well as the long upward drift or trend. A third chart depicts the movements in paper and board per capita with the moves of the business cycle as a percentage of normal. The most important conclusion to be drawn from these data is the fact that the per capita consumption of paper and board, despite the ups and downs of the business cycle which modify it, is steadily growing in a long-term upward sweep. E.S.

VINCENT, REX. A review of the 1948 market pulp situation. Paper Trade J. 128, no. 8: 92 (Feb. 24, 1949).

Production of wood pulp (all grades) in 1948 was very close to 12,900,000 tons, about 2,176,000 tons being imported, slightly less than in 1947. Of this amount, 1,593,543 tons came from Canada. The nonintegrated mills face a rather constant supply of pulp and are forced to pay higher and higher prices as their demand increases. The increasing supply during the past year came partly from new mills constructed after the war and partly as the result of small amounts here and there all over the continent. Only one strictly market pulp mill has been built in Canada since the end of the war. Over the 18-year period from 1930-1948, the average annual increase in production was about 461,000 tons, the growth of the kraft industry being the largest single factor responsible for this growth. During 1948, the market turned from a seller's to a buyer's market; production of pulp and paper in 1949 is expected to be below the figures for 1948. Imports of pulp will, naturally, be lower also. Thus, 1948 may not only be a peak year for the production of pulp and paper, but it might also be a peak year for the amount of market pulp offered for sale. E.S.

WHITAKER, HOWARD E. ECA influence on the pulp and paper industry. Paper Mill News 72, no. 9: 100 (Feb. 26, 1949); Southern Pulp Paper Manuf. 12, no. 3: 38, 40 (March, 1949).

The author gives an account of the items for which the $51,000,000 which the Pulp and Paper Branch of the Economic Cooperation Administration authorized were spent; 2% was used for pulpwood, 23% for rayon pulp, 50% for paper and board pulp, and 25% for finished products, including newsprint, container board, and many specialized technical grades. About 90% of these materials were purchased in North America; 10% came from Europe. About $31,000,000 worth went to the United Kingdom, $10,000,000

worth to Bizone, Germany, and the balance was distributed to France, Italy, Netherlands, Belgium, and Ireland, with a very small allotment in each case to Greece and Iceland. E.S.

PAPER AND PULP INDUSTRY—EDUCATION

HUTLEY, H. R. The technical education of juveniles in the paper industry: practical considerations. Paper-Maker (London) 117, no. 2: 85-6, 88-90, 96-7 (February, 1949).

The author deals with the practical side of juvenile instruction as a means for employing the right way of initiating the young employee into the industry. After briefly outlining the manner in which the majority of young British employees entered the industry years ago and emphasizing the expense and waste in time and labor involved, the need for a good basic technical education for juveniles is stressed. Useful suggestions are given for the recruitment of young employees and the organization of a course when a number of newcomers are started at the mill, including subjects, the selection of instructors, educational aids, tests, and assessment of results. Throughout the article, the author emphasizes the importance of careful planning and an understanding of the mental outlook of the young people by the instructor. E.S.

PAPER AND PULP MILLS

ANON. Hawthorne Co. modernizes: equipment improved; capacity added. Pulp & Paper 23, no. 3: 90-1 (March, 1949).

The Hawthorne Paper Co., Kalamazoo, Mich., has raised its average daily tonnage of technical papers, base-stock reproduction, and rag-content papers from 30 in 1940 to 35 in 1947. Installations now in progress or recently completed include two new Wickes type-A boilers, a Beloit Fourdrinier section for the No. 1 machine, a new drive with a Westinghouse turbine for the No. 2 machine, a Bird screen, Bird savealls, a Noble & Wood Victory beater, a new water-treatment plant, and a Horton variable-speed clutch pulley serving a Langston rewinder. R.R.

ANON. A new kraft center; paper mill and barker plant in Tacoma set new engineering standards. Pulp & Paper 23, no. 3: 34-5, 39-41, 43, 45-7, 49, 51, 53, 57, 62 (March, 1949); Paper Trade J. 128, no. 10: 25-7 (March 10, 1949); Paper Mill News 72, no. 14: 12-14, 16, 20, 22, 26-7 (April 2, 1949); Southern Pulp Paper Manuf. 12, no. 4: 32, 34, 36 (April, 1949).

An illustrated detailed description is given of the Tacoma, Wash., mill of the St. Regis Paper Co., which began making kraft multiwall bag paper in January on its Pusey & Jones 180-inch Fourdrinier, which is designed for a speed of 2100 ft./min. The wood-preparation plant houses two hydraulic and one drum barker and three chippers. Seven kinds of wood are used, all of which converge on a 60-inch belt to three big concrete chip silos. The pulp yield is almost 20% greater than that normally achieved. Among the unusual features in the mill are the hydraulic high-pressure oil-pump-driven motors to actuate suction box, press, and drier doctor oscillators and to eject and dump rolls from the winder, individual General Electric electronic-amplidyne speed regulation of each machine section, a 14-foot broke Hydrapulper with broke dropping into it by gravity, the extensive use of stainless steel, "color coding" of all process piping and electric conduit for identification and protection, a Hercules Powder Co. automatic emulsifying process (*cf.* B.I.P.C. 19: 493), the use of reinforced concrete

in place of structural steel from basement to work floor, continuous corrugated glass panels with stainless steel fittings instead of steel sash, and insulated wall panels. Equipment in the paper mill building includes 10 Majestic jordans with General Electric recording wattmeters, an 8 × 16-foot Oliver United saveall, a DeZurik consistency regulator with a stainless steel vat, Shartle agitators, 11 Gould stock pumps (three on white water, and one on cold water), and a Worthington 36 × 30-inch fan pump for handling 0.2% stock to the slice. In the Fourdrinier section, the Pusey & Jones-type flow spreader is combined with a new high-speed closed-pressure hydraulic nozzle slice of stainless steel and stainless-clad steel. The 180 × 120-foot wire is equipped with a shake and a raising and lowering device and combined with Pusey & Jones Rapidrape "run-out" wire-changing equipment. A Downingtown 44-inch suction couch roll is supported from the press section, making it unnecessary to remove the roll when the wire is changed. Three General Electric photoelectric "eyes" operate a jet of water which cuts the paper sheet at the couch when a break occurs. There are four drier sections, three with 20 60-inch rolls and six, four, and two felt driers, and the last with 16 drier rolls and two felt driers; two Lobdell calender stacks of eight rolls each; and a Pope-type uniform-speed reel. The electrical equipment and the 11 Drew air systems are also considered. R.R.

ANON. Three hundred years of paper making. Paper-Maker (London) 117, no. 2: 101, 103 (February, 1949).

The Eynsford Paper Mills in the valley of the Darenth, Kent, England, have recently celebrated the 300th anniversary of their foundation. A brief history of the mill and its various owners—as far as their names are still known—is given and mention is made of some of the well-known watermarks used by the mills. Much of the early history was lost in a fire in 1777; another disastrous fire occurred in 1908. The mills are making hand- and mold-made papers and are at present owned by Spicers, Ltd. E.S.

BRITISH COLUMBIA PULP & PAPER COMPANY LTD. Photographs reveal emphasis on remote control at Woodfibre. Western Pulp and Paper 2, no. 2: 12-17 (February, 1949).

An explanation is given of photographs showing operations at the Woodfibre mill, which is one of the two existing mills capable of producing commercially 96% α-cellulose pulp for acetylation. Production for 1948 was 69,000 tons. R.R.

MOORE, GORDON. Michigan mill modernizes. Paper Ind. 30, no. 11: 1609-13 (February, 1949).

The author gives an illustrated detailed account of the work done at the Lee Paper Co. mill at Vicksburg, Mich., for the major rebuilding program. The work was planned and carried out so that a Fourdrinier wet end was replaced in only 10 days of down time; a new Fourdrinier, a new press section, and new driers were installed in 28 days of down time; and the machine-room roof was torn out and rebuilt in 7 days. The engineering staff of The Black-Clawson Co. co-operated closely with mill officials and engineers to make such speed possible. Except for the roofers and a contract pipe-fitting job, all labor came from the mill. R.R.

ROOT, EDWARD M. W. C. Hamilton starts No. 7 paper machine system. Paper Trade J. 128, no. 12: 19-21 (March 24, 1949).

An illustrated description is given of the new stock-preparation system (Hydrapulper, Hydrafiners, Hydracycle tanks, and jordans, if desired)

operated by remote control at the Miquon, Pa., mill and of the new No. 7 paper machine designed to produce 50 tons of fine papers daily, although it has already produced 61.5 tons in a 24-hour day. Details of the new installations are discussed. E.S.

SCHNYDER, A. P. India's first newsprint mill. Paper Mill News 72, no. 10: 5, 14-15 (March 5, 1949); *cf.* B.I.P.C. 18: 246.

The first Indian newsprint mill will be located at Chandni, northeast of Bombay, and will have a daily capacity of 100 tons of newsprint, the furnish to consist of 60% Salai (*Boswellia serrata*) groundwood pulp and 40% bleached kraft bamboo pulp. The mill will be an entirely integrated unit and consist of a groundwood mill, a bamboo-chipping plant with storage and handling facilities for bamboo, storage and handling facilities for Salai, a stock-mixing division, a paper mill, a power plant, and a water-pumping and -treatment plant. Details of the layout and construction are given. E.S.

PAPER AND PULP MILLS—WATER SUPPLY

DIETLEN, OTTO. Fresh water, white water, and shower pipes in the paper industry. Wochbl. Papierfabr. 77, no. 1: 12-14 (January, 1949). [In German]

The circulation of the process water is illustrated schematically for a groundwood mill thickening its pulp to 5% consistency for use in an integrated paper mill, a groundwood mill producing boards with 26% moisture content, and a paper mill with a daily production of 10,000 kg. The author discusses the necessary addition of fresh water under those different conditions and means for reducing the amounts, particularly in connection with shower pipes. A diagram illustrating the relationship between diameter of shower pipes, pressure, and water requirements (length of shower pipe, number of perforated rows, and size of individual holes) is included. Calculations for determining the required amounts of water for the three examples under discussion are given. E.S.

PAPER AS A TEXTILE MATERIAL

BUSCH, WILHELM. Paper yarns and their present applications. Wochbl. Papierfabr. 77, no. 1: 14-15 (January, 1949). [In German]

Paper yarns are still in demand as substitutes in the upholstery trades, for emergency mattresses, weaving hats, shopping bags, and other applications, which will probably more or less disappear, when textile raw materials become more plentiful. For certain technical applications, on the other hand, their continued use is predicted, even with the return of more normal market conditions. Particular reference is made to pulp yarns prepared by the wet-spinning process. These applications include yarns for weaving the woof of rubber bands and cable insulation for telephone wires. Tabulated data of the physical properties of such yarns are included. E.S.

PAPER FINISH

DAY, FREDERICK T. Paper finishing. Brit. Packer 11, no. 3: 28-9 (March, 1949).

Paper finishing covers various processes applied to both paper and board. It may be used to enhance the appearance of the paper and the finished job, help subdue a crisp paper where desirable and stop its rattle,

make it damp- and waterproof, lessen paper glare, and add to the resistance and wear of paper. Mention is made of applications requiring specially finished papers. Among the variations possible with varnishing are place or strip varnishing, water varnishing, and Oylin finishing. Embossing and finishes such as canvas, hopsack, linen, pebble, hammer, etc., are also described. R.R.

PAPER MANUFACTURE

WESTON, HARRY E. Papermaking—50 questions and answers. Paper Mill News 72, no. 9: 46-50 (Feb. 26, 1949).

Fifty questions and their answers are presented, pertaining to the pulp and paper industry and including historical, technical, economic, and statistical information. E.S.

PAPER SIZING

WILFINGER, HUBERT. Current problems in the sizing of paper. Neue deut. Papier-Ztg. 3, no. 3: 86-7 (Feb. 15, 1949). [In German]

With reference to the current rosin shortage in Germany—which is not likely to be alleviated in the near future—the author reviews efforts for replacing or extending rosin sizes. Although synthetic resins (condensation products of anthracene and crotonic or maleic acids) have been developed which can take the place of rosin size, their price is prohibitive. Extenders of rosin size, on the other hand, have been economically feasible. Neubert and Krzikalla developed a synthetic resin from ammonium chloride, formaldehyde, and acetaldehyde (trade name Luresin, German patent 716,160) which gave excellent sizing results in combination with rosin. However, precautions are necessary in handling the product which is liable to cause skin irritations of susceptible workers. The search for another product was, therefore, continued and in 1944 negatively charged, highly condensed urea resins (Rosin Extender 3584, patent applied for) were brought on the market, which are not irritating to the skin and are just as effective as Luresin resins. With the use of such extenders, the rosin consumption can be reduced about 50%. The sizing problem of printing papers is somewhat different. Newsprint is hardly ever sized. For other printing papers, mineral sizes, notably sodium silicate, have been used. However, in certain types of printing papers silicic acid may precipitate and cause dusting. Urea resins have proved more effective, even without rosin, for the cheaper grades. For better printing papers, the addition of wax or paraffin emulsions offers advantages. 12 references. E.S.

PAPER SPECIALTIES

ANON. Envelope company adds flavor to its sales. Am. Paper Converter 23, no. 3: 13 (March, 1949).

The Sheppard Envelope Co. has been using a flavored gum for envelopes since 1947 to identify its "Flavor Seal" product. In addition to increasing sales, the idea has helped to break down jobber preference for nonbranded goods and provided a welcome for salesmen. R.R.

ANON. Here comes the parade! Paper Sales 9, no. 3: 13-19, 30, 32, 34, 36, 38, 40, 42 (March, 1949).

An illustrated review is given of new and changed items which might be sold by paper salesmen, including gift and frozen-food wraps, crepe paper, doilies, drinking straws, heat-sealing envelopes, paper bags, holiday

party sets, insulated ice cream cartons, matched tableware, meat boards, the Elmendorf Jr. paper-tearing tester, paper towels, plastic boxes, shelf papers, soda cups, waterproof and waxed bags, etc. R.R.

ANON. New paper uses in delicatessen stores. Paper & Twine J. 22, no. 12: 9, 20 (February, 1949).

Paper salesmen are reminded of the opportunities offered by delicatessen stores as outlets for round nested containers, waxed paper, paper bags, food trays, paper napkins, household rolls of paper, etc. Sales points for packaging in the round containers include their convenience in modern self-service sales, sanitation, and improved appearance. R.R.

AREND, A. G. Watertight, grease-proof and laminated packaging papers. Brit. Packer 11, no. 2: 29-30 (February, 1949).

Water passes through paper by way of minute openings between the individual fibers, rather than along or through the fibers. By filling these openings with a water-impervious material paper is made waterproof. Water vapor not only passes through the openings, but is also transmitted by the fibers. Thus, paper must be completely covered by a continuous vapor-impervious film if it is to be vaporproof. The waxing processes are briefly described. Paper is made greaseproof by impregnating it with materials which are only slightly soluble in grease, fat, or oil, such as microcrystalline waxes, and by laminating continuous films of cellulose, such as glassine or cellophane, to the paper. If the laminating is done by means of a selected microcrystalline wax, the product is also moistureproof. R.R.

BOWES INDUSTRIES, INC., *Chicago.* Complete matched table service. Am. Paper Merchant 46, no. 3: 21, 58 (March, 1949).

The Bondware Hostess line has been increased by the addition of plates especially made for hot and greasy foods and tableware, making possible the use of a complete table service matched in color and design. The entire line is of paper except for the plastic tableware. The new plates are plastic surfaced, odorless, unaffected by any food, and very resistant to hot or cold liquids. Conventional paper plates are also available. R.R.

BULL, NORMAN G. Plastics stretch the ply supply. Wood 4, no. 3: 20-1, 45 (March, 1949).

Most plywoods now being surfaced with cured thermosetting resin-impregnated papers are either Douglas fir or Western hemlock. They are made with a dense or a more porous surface. The former (high resin plywoods) are produced from sound woods and paper impregnated with 40-50% of resin. The second type uses specially impregnated papers, known as masking sheets, which are usually relatively thick and can conceal appreciable defects in the underlying wood veneers. Masking overlays contain 20-30% of thermosetting resins and result in a product that is less resistant to moisture vapor and abrasion than is high resin-content overlay plywood. High resin plastic-surfaced plywoods are resistant to water, moisture vapor, abrasion, stain, organic solvents, mild acids and alkalies, scuffing and splintering, wash easily, and minimize grain raising and reduce surface checking in softwood plywood. The phenolic resin used materially influences some of the physical properties of the surface. Relatively few test data are available on strength properties of plastic surfaced plywood, but it is known that increases in the thickness of the plastic surface influence the flexural strength of the plywood. Surfaced plywood can be worked

like wood and painted with any paints except those having a short oil vehicle. R.R.

CROCKETT, WILLIAM C. Help the locker operator lick his greatest foe. Paper Sales 9, no. 3: 23, 46, 48 (March, 1949).

The greatest number of people who discontinue using the facilities of locker plants do so for reasons directly attributable to faulty packaging. The author describes his method for illustrating the prime importance of quality wrapping papers that are moisture- and vaporproof. In addition, a locker wrap must be flexible and moldable enough to permit easy wrapping and have a satisfactory dry and wet strength. Laminated papers can do a much better job than a plain locker wrap. Illustrations are given to show the steps in using the drug store wrap which the author considers best for locker use. R.R.

FISHBURN, VICTOR E. Problems of a dry mat manufacturer. Printing Equip. Engr. 77, no. 6: 34 (March, 1949).

A discussion is given of the problems to be met by manufacturers of stereotype dry mats for use in newspaper printing: no fixed obligation of the user for orders placed, large numbers of rush orders, wide variations in thicknesses and moisture requirements, the varying properties necessary for use with different equipment, high shrinkage, the necessity of wrapping the mats for protection against moisture changes, etc. R.R.

FISHER, THOMAS G. Reduce fires with flame-retardant treated paper. Am. Paper Converter 23, no. 3: 14 (March, 1949).

From an economic point of view paper is best treated at some point during the manufacturing process to make it flame resistant. The desired end is a paper which, when the test flame is withdrawn from contact with a 2 × 6-inch sample after a 12-second exposure, will permit no afterflame or afterglow. The 1947 California law is discussed which requires all drapes, hangings, curtains, drops, etc. to be made from noninflammable material or treated with a state-approved chemical to render them flame retardant. Justification for the law lies in the loss of over 10,000 lives annually by fire in the United States. Most disastrous fires originate or soon involve inflammable decorations. Because of the availability of an abundant oxygen supply in and about the fibers of paper and flimsy fabrics, combustion assumes the speed of a low-grade explosion. Ignition need not be by open flame, but can come from prolonged exposure to temperatures not greatly in excess of normal or from a blast of air heated above the ignition temperature of crepe paper and some fabrics. R.R.

JOSHI, K. B. Hand-made paper: its development in India. Indian Pulp and Paper 3, no. 7: 273-8 (January, 1949).

Because no systematic records were kept of such matters, the introduction of paper and papermaking to India is obscure. In 671 A.D. paper was rare in that country and used only for religious purposes. Papermaking was probably brought to India by the Moslems in the eleventh or twelfth century. The first Indian factories were located at Kashmir and in the Punjab. The Nepal industry was brought directly from China via Lhasa, perhaps much earlier than 1105 A.D., and produced paper which has been regarded as very superior. The Indian process used principally old bags, ropes, and nets made of sunn hemp which were brought in by caravan. The factory owner was usually a vatman; other labor was chiefly on a contract basis. With the advent of British control, a systematic attempt

was made to discourage native industries and support British products. After about the middle 1800's, cheaper foreign-made articles captured the domestic markets. New and more conveniently located towns were set up and, with the advent of railroads to these localities, the old caravan trade and source of raw material gradually vanished. Technical improvements in and the mechanization of papermaking improved the product and lowered its cost, contributing to the decline of the domestic industry. In England there are at present only four or five handmade paper mills, whereas the Chinese and Japanese industries are flourishing. The qualities of handmade paper make it valuable for special purposes where strength, durability, elasticity, and freshness are required. In Japan and China, it is much used for raincoats, windows, and screens. A discussion is given of Indian fibrous plants which are useful as papermaking material. In conclusion, the author discusses the future of the domestic cottage industry. R.R.

PATENTS

MAKARA, FRANK. Patent attorney procedure. Initial protection of inventions. Paper Trade J. 128, no. 7: 23-4; no. 10: 27-8 (Feb. 17, March 10, 1949); *cf.* B.I.P.C. 19: 416.

In the first of the two articles the author discusses searches for the "prior art" and procedures for making a patent application. In the second article, methods for keeping good authenticated records of all stages of the invention are described. E.S.

PHOTOCHEMISTRY

LAUNER, HERBERT F., and WILSON, WILLIAM K. The photochemistry of cellulose. Effects of water vapor and oxygen in the far and near ultraviolet regions. J. Am. Chem. Soc. 71, no. 3: 958-62 (March, 1949).

Water vapor was found to retard and oxygen was found to be without effect upon the decrease in α-cellulose and the depolymerization of cotton and wood celluloses during irradiation in the far ultraviolet. The reverse of both of these effects was confirmed for the near ultraviolet. The contrasting behavior of cellulose in the two spectral regions is ascribed to bond energies in the molecular chain, in relation to the photon energies involved. Far ultraviolet photons have sufficient energy to disrupt the bond, whereas most near ultraviolet photons do not, and require participation of oxygen. The retarding action of water vapor in the far ultraviolet is ascribed to interchain water bridging with the hydroxyl group on carbon atoms 2 or 3, thus interfering with the freedom of displacement of the carbon atom. This supports the theory that a part of the moisture in cellulose is in a fundamental chemical combination. It was found that only one photon out of 1000, at 254 mμ, encounters conditions favorable for a rupture of the cellulose molecular chain. 21 footnotes. E.S.

PHYSICAL TESTING—PAPER

OSWIN, C. R. Protective wrappings. Brit. Packer 11, no. 3: 24-5, 29 (March, 1949).

Tests are discussed which were made on commercially available nonporous flexible materials less than 0.02 inch thick for determining tensile, tearing, bursting, and seal strengths, elasticity, and resistance to water vapor, oxygen, carbon dioxide, and odor penetration. The data obtained on nine types of wraps (waxed and glassine papers, viscose, acetate, rubber

hydrochloride, polyethylene, polyvinyl chloride acetate, and vinylidene chloride films, metallic foils, and laminations of one or more of the above classes) are tabulated. Transparent regenerated cellulose and laminates rate higher in more of the tests than do the other materials studied. R.R.

PETERI, R. The significance of laboratory [paper] tests. Bull. assoc. tech. ind. papetière 3, no. 1: 2-8; discussion: 8-12 (February, 1949). [In French]

The author examined eight different wrapping papers made in regular mill runs and compared them in each case with papers made from identical stocks beaten in the mill to the same degree S.-R. but converted into test sheets on a British sheet-making machine (I), and beaten in the laboratory to the same freeness and made into test sheets (II). The pulps varied from that of a straw cook to kraft pulps made from tropical hardwoods, with freeness varying from 17 to 63° S.-R. An excellent correlation was found in nearly all cases between the breaking lengths (III) of the various products, e.g., with one exception, the variations in (III) between commercial papers and (II) were within 10%. Bursting strengths were also very similar, although variations between a paper from a mill run and (II) were at times 40-45%. Tear tests showed no such satisfactory relationship and, in the case of (AFNOR) porosity, no relationship whatsoever could be found between (I), (II), and the corresponding commercial papers. The Lamort laboratory beater was usually used in the preparation of (II); the Lampén mill proved unsatisfactory. Tabulated results are given and discussed critically. L.E.W.

PHYSICAL TESTING—PAPER—BURSTING STRENGTH

OWEN, R. M. Tensile strength with a modified Mullen tester. Pulp Paper Mag. Can. 50, no. 3: 161-3 (Convention, 1949); *cf.* B.I.P.C. 13: 112.

The relationship of Mullen burst, tensile strength, and percentage of stretch of paper is reviewed. The need of a quick and simple method of determining the relative tensile strength of newsprint in the machine and cross directions resulted some years ago in the development of a slight modification in the ordinary Mullen test. This modification consists in the use of an oblong aperture to replace the circular aperture in the Mullen tester tripod. The limitations and errors involved in this test are discussed. It is shown that the modified Mullen tester gives results which are in close proportion to the actual tensile strength. This test has been used for some years in several newsprint mills in grading the strength value and uniformity of the paper. E.S.

TUCK, N. G. M., and MASON, S. G. Some factors influencing the accuracy of Mullen testers. Pulp Paper Mag. Can. 50, no. 3: 132-41 (Convention, 1949).

The variation of pressure with time in Mullen burst tests on paper was determined by taking pictures of the motion of the gage needle at 64 frames per second. It was found that the pressure increases at an increasing rate to a maximum at burst and then decreases suddenly. The rate of change of pressure over a short period before the burst occurs is constant, and is proportional to the burst pressure for any one gage and for a variety of paper samples. The proportionality constant is determined by the gage expansibility. The expansibility of a number of gages in use on Mullen testers was measured; a variation from 0.6 to 6.4 $\times$ 10^{-3} cc./lb./sq. in. was observed. The gage expansibility has a marked effect on the rate of strain-

ing of the sample during a burst test. This in turn can influence the burst pressure. To eliminate this source of variation, the gage expansibility should be specified in the standard test method. The effect of air in reducing the burst pressure has been studied. A simple method for detecting air in the Mullen tester is described. The removal of air is greatly facilitated if ethylene glycol is used instead of glycerin. From the data on the rate of loading, a theoretical analysis of the dynamic errors in gages has been made. The errors are of three types and arise from friction, vibration, and overshooting of the needle mechanism. The cumulative dynamic error is of the order of 2%, and is caused mainly by overshooting. If accuracy better than 3% is sought, the gages should be calibrated under dynamic loading conditions. A method of doing this is briefly described. E.S.

PHYSICAL TESTING—PAPER—COLOR

SÈVE, R. Theoretical study of the whiteness of paper. Papeterie 70, no. 11: 353-5, 357; no. 12: 391, 393-5, 397 (November, December, 1948); 71, no. 1: 2-3, 5-7; no. 2: 38-9, 41-3 (January, February, 1949). [In French]

The author reviews the principles of photometry, photoelectric equipment, and the study of optical properties as applied to paper. 24 references. L.E.W.

PHYSICAL TESTING—PAPER—OIL WETTABILITY

NOLL, AUGUST. The determination of the oil wettability of paper. Wochbl. Papierfabr. 2, no. 77: 39-41 (February, 1949). [In German] *cf.* B.I.P.C. 18: 698-9.

The author describes the application of the Netzometer to the determination of the oil wettability (I) of paper, using diethyl phthalate as the testing liquid. With slight modifications (widening of the cylindrical glass container at the bottom), the apparatus and testing procedures are identical with those described in the previous reference for wettability by water. Tabulated data are included, illustrating the relationship between the time of (I) with beating period, degrees S.-R., and sheet density of unsized and sized sulfite and sulfate papers. The results with the instrument are reproducible and analogous with those obtained for water wettability, although the data for (I) are consistently lower. E.S.

PHYSICAL TESTING—PAPER—SIZE RESISTANCE

BRAUNS, O. Apparatus for testing the surface wettability of paper. Svensk Papperstidn. 52, no. 2: 45-6 (Jan. 31, 1949). [In Swedish] *cf.* B.I.P.C. 13:65.

An illustrated description is given of the modification of the apparatus (built in the Swedish Forest Products Research Laboratory) described in TAPPI Tentative Standard T 458 m-45. E.S.

ELLIOTT, FREEMAN W. A new electronic sizing tester. Pulp Paper Mag. Can. 50, no. 3: 125-8 (Convention, 1949).

The instrument was designed primarily to test the internal sizing of food-container and drinking-cup stocks in a minimum of time with the assurance of reproducible results. It consists of three main parts: a control box containing the electronic tubes and relays, the cup for holding the paper sample and electrolyte (usually a saturated solution of calcium sulfate) and an electric stop clock. The current used is 110 volt, a.c., and

the voltage is kept constant by means of a voltage stabilizer. The device for holding the paper sample consists of two stainless steel cylinders. At the upper end of the bottom cylinder are 12 perfectly flat terminals, the ends all being in an exact plane and each terminal forming the end of a low-voltage electric circuit connected to a tube and relay. The upper cylinder contains a cup having 12 holes in the bottom which fit exactly over the 12 terminals. The instrument includes 13 separate electronic circuits, 12 of which are connected to the contacts in the test load. They are so designed that, at a definite resistance of the paper under test, the tube conducts and operates a relay. The 13th circuit is interconnected with the other 12 in such a manner that, when the desired number of signals has been received, the 13th tube opens a timing clock relay. The operation of the instrument is outlined. It has not yet been standardized with respect to many grades of paper, because it will be rebuilt and certain improvements incorporated, so that it can be used on all stocks where internal sizing is required. In connection with surface sizing, the instrument is of value in indicating a needless excess of size. Data on the correlation of results obtained with the electronic meter and other sizing tests are discussed and illustrated in graphs. E.S.

PHYSICAL TESTING—PAPER—VAPOR TRANSMISSION

HEERING, H., PUELL, H., and DREWITZ, I. Determination of the water vapor permeability of cable coverings. Kunststoffe 38, no. 3: 49-51 (March, 1948). [In German]

The authors describe a "cup method" of measuring WVP and present data for a number of natural and synthetic high polymers. One cup or cell consists of a thin aluminum washer of 25 mm. inside diameter, to each side of which a sheet of the material to be tested is sealed; a disk of filter paper saturated with water occupies the hole in the washer. Such assemblies weigh approximately one gram. These cells are stored in a desiccator over phosphorus pentoxide and weighed at suitable intervals on a semimicrobalance. The sealing materials were nonvolatile solvents or Vistanex-transformer oil mixtures. For materials which contracted strongly, the aluminum ring was replaced by a gum rubber ring and the two specimen disks were pressed on each side of the rubber ring with aluminum clamping rings. The WVP at 25° C. with 100% R.H. in the cup and 0% R.H. outside the cup are given for the materials listed in g./cm. thickness/sq. cm. area/mm. mercury vapor pressure difference: Vistanex-carbon mixtures, 0.006-0.08; paraffin, 0.02; polyisobutylene, 0.14; Thiokol mixtures, 0.08-0.5; polyethylene, 0.22; polybutylene-polystyrene mixture, 0.25; rosin, 0.34; bitumen, 0.8; gum rubber, 0.8-5; gutta percha, 1.3; polyvinyl chloride mixtures, 2-10; polystyrene, 3.3; benzylcellulose, 16; polyacrylate, 31; regenerated cellulose, 77-200; cellulose triacetate, 100. G.R.S.

LIEBERT, ERHARD. American methods for determining water vapor permeability of papers and other materials. Das Papier 3, no. 1/2: 8-14 (January, 1949). [In German]

An illustrated review is presented. 15 references. L.E.W.

PIGMENTS

BARNETT, C. E. Physics and chemistry of pigments. Ind. Eng. Chem. 41, no. 2: 272-9 (February, 1949).

The author deals first with the optical properties of pigments. A study of the publications of the past 25 years on paints and pigments compels

the conclusion that, 25 years ago, the principal limitation of the paint formulator was the low hiding power of his pigments. Today hiding power is no longer the limiting factor and the formulator is free to concentrate on other variables that respond to pigmentation. Increase in pigment hiding power constitutes one of the major pigment advances of the past 25 years. Its effects weave in and out through the whole range of paint formulation. Research on the surface chemistry of pigments is summarized. This is an attractive field of research in the pigment industry because definite changes in the character of pigments can be made rather simply and the results of small scale experiments can be readily converted to plant scale. Finally, new pigments and the more important improvements in old ones that have been made during the past 25-year period are discussed. 121 references. E.S.

PLASTIC FILMS (NONCELLULOSIC)

PARLIMAN, J. H. Polyethylene permeability. II. Modern Packaging 22, no. 7: 119-22 (March, 1949); *cf.* B.I.P.C. 18: 860.

The author reviews the work reported in the earlier reference and tabulates permeability values for 12 liquids, including 30% hydrogen peroxide, water when permeating films having hydrophobic and hydrophylic surfaces, solid camphor, and xylenesulfonic acid, and for 25 commercial products, of which 22 are liquids, two are creams, and one is a solid. The method formerly used has been slightly changed in that the bag is no longer placed flat on a suspended wire screen, but hung vertically from a wire or small glass rod. When highly viscous liquids, such as mineral and lubricating oils, are tested by the standard permeability bag test, the outer surface of the bag soon becomes oily; however, the actual weight loss over a long time is very low. It is suggested that diffusion through the film and evaporation are slow, so that the concentration of diffusing molecules soon becomes nearly equal across the thickness of the film and the diffusion rate is lowered. When the film is essentially saturated, the oil no longer dissolves readily in the film and permeation speed and weight loss are lowered. When the oils are placed in polyethylene bottles, with thicknesses 25-35 times those of the bags, no oily film is felt on the outside of the bottles. This extra thickness reduces the rate of diffusion to less than the rate of evaporation. It has been found that any mixture of diethyl ether and methyl alcohol is transmitted more slowly than their averaged rates. Any investigation of the permeation of mixtures of liquids through polyethylene must consider the amount of each component permeated, as well as the over-all average weight loss over a period of time. A discussion is presented of the results obtained with 35.8% hydrochloric acid, 26% ammonium hydroxide, and hydrogen peroxide exposed to and kept from light. There was little difference between polyethylene bags with hydrophobic and those with hydrophylic surfaces. Further work is indicated on mixtures, on the basic mechanism of molecule transfer, and on the swelling of polyethylene produced by certain types of molecules. Tests with thin heat-sealed film of two-directionally oriented polystyrene should present interesting liquid transfer data. R.R.

POPLARS

JAYME, GEORG, SCHENCK, UDO, and ROTHAMEL, LUDWIG. Regular changes in the properties within an individual bole in the case of poplarwoods. Das Papier 3, no. 1/2: 1-7 (January, 1949). [In German]

The wood was taken from different sections of an individual tree trunk in each of three selected specimens of *Populus serotina* (I), *P. robusta*

(II), and *P. trichocarpa* (III). In all cases the pentosan, ash, and cellulose contents decreased progressively from butt to crown. Sulfate pulp yields also decreased and methanol-benzene extractives increased markedly. No clear-cut progressive changes in lignin were noted. The extreme differences in sulfate pulp yields carried out under carefully standardized conditions (*cf.* B.I.P.C. 19: 308) were 1.26 to 4.31%. No progressive or marked changes in wood density were found, except in the case of (III), in which the density decreased toward the crown in the sapwood but rose in the heartwood. Outer and inner bark content was lowest in the middle of the bole. A well-grown trunk of (II), selected from the same site on which grew a poorly developed specimen of (I), showed a somewhat higher cellulose content than did (I). On the other hand, specimens of (I) are fully capable, even after 10 years of growth, of producing higher cellulose yields than do specimens of (II) (for the same growth period), even when grown in close proximity to each other. Light deficiency caused marked growth inhibitions with concomitant lowering of the cellulose content. Species, site, and surrounding regions all may influence chemical composition. The standardized kraft cook, when applied to beech, gave approximately 53% yields (somewhat lower than those usually obtained from poplars), and these cooking conditions failed to delignify spruce (which require a maximum temperature of 170° instead of 155° used for hardwoods). Under these more drastic conditions, the spruce-pulp yield was 49.4%. Despite slight differences at various parts of the tree, the over-all yields from well-grown poplarwood are entirely satisfactory. 11 references.

L.E.W.

PRINTING AND PRINTER'S INK

HORWITZ, DAVID. Mottle—its cause and cure. Am. Ink Maker 27, no. 3: 27-8 (March, 1949).

Among the major contributing causes of mottling are the variables inherent in paper surface tension; improper color grinding, the incorporation of coarse pigments in the ink, improper setting of the rollers, and improper adjustment of the ink-feeding mechanism are other important causes. Mottle is encountered mainly with transparent colors and with opaque chrome greens and medium browns. The use of paper which lifts the ink from the rolls properly and of opaque or semi-opaque colors with rough-surfaced papers are two of the suggestions given for avoiding the difficulty. The need of a more intensive study of paper-surface reaction to ink is emphasized.

R.R.

VOET, ANDRIES. Rheology of typographic printing inks. Am. Ink Maker 27, no. 2: 27-30, 41 (February, 1949).

While ink is moving toward the press distribution system, it should level out by gravity alone, which requires a low yield value and no thixotropy. During the distribution phase of the typographical process, when the ink is put on the press rollers and the plate is inked, there is a definite upper limit of ink viscosity allowable in order that the ink is transferred properly to each roller and to the form. To prevent misting, a high yield value is desirable. The necessary compromise between the demands of these two phases usually results in an ink of a fairly low yield value with consequent misting on high-speed presses. It has recently been found that misting may be avoided by the use of certain aqueous emulsion inks. When ink is transferred to paper, the ink must be as highly resistant to deformation as is compatible with the tackiness allowed by the web speed and by the resistance to picking of the paper. With slower press speeds, the ink should be more viscous. Although the rheological behavior of printing inks at various shearing stresses is understood fairly

well, little is known about the tack-flow relationship and much research is necessary in this field. The influence of the paper is also of importance. An apparatus is described to measure tack in fundamental units, in a thin film, at a definite press speed, and at a known pressure; it also gives an accurate evaluation of the force necessary to rupture any given paper surface under the experimental conditions. The instrument consists of a cylinder which may be covered with paper and which moves down a plane and rises on a second plane because of its momentum. A small inked plate in the path of the cylinder causes adhesion of the ink to the cylinder. Differences in the height attained by the cylinder under varying conditions are compared to give the desired data. 12 references. R.R.

RAYON—STATISTICS

ANON. Cellulose in rayon. Rayon Or'ganon 20, no. 3: 36-8 (March, 1949); *cf.* B.I.P.C. 18: 864.

A total of 539,500 short tons of cellulose was consumed by the rayon industry during 1948 (an increase of more than 13% over the previous year), composed of 435 short tons of dissolving wood pulp and 104,500 tons of refined cotton linters. These data are confined to the consumption of chemical pulp used in the manufacture of rayon filament yarn, staple, and waste and do not include pulp consumed in the manufacture of cellophane, plastics, or other products. Cotton linters supplied 19% of the total as compared with 17% for the previous year; the 81% supplied by wood pulp represent a 10% increase over 1947. The slight shift in the consumption pattern was undoubtedly strongly influenced by the price trends during the year and the narrowing of the price spread between the two items. The wood pulp used in both viscose and cupra yarn and staple declined from 87 to 86%, with the use of cotton linters increasing from 13 to 14%. Linters pulp accounted for 35% of the acetate production as compared with 32% in the previous year; wood pulp declined correspondingly from 68 to 65%. The rayon industry during 1948 consumed 67% of the total supply of dissolving pulp, the balance being available for the production of film, plastics, lacquers, cellophane, etc. E.S.

RAYON—VISCOSE PROCESS

BARTUNEK, RICHARD. Hindrance to viscose formation on account of the properties of the individual fibers and the pulp sheet. Das Papier 2, no. 23/24: 442-5 (December, 1948). [In German]

Inhibited viscose formation, as manifested by poor filterability, is traced to insufficient delignification and to incomplete bleaching of the individual fibers. Incomplete mercerization is correlated with unfavorable qualities of the pulp sheet. Lignin residues may cause marked resistance to solution. The floating and warping tendencies manifested by certain spruce sulfite sheets during the steeping process are caused by pronounced cloudy formation of the pulp sheets. Tests are outlined which forewarn of future filtration difficulties. When a beech sulfite pulp shows too great a surface absorptive capacity and too low a rigidity, its usefulness in viscose formation is highly questionable. The viscose manufacturer can seldom remedy these defects which become problems of the pulp manufacturer. Pulp homogenizing prior to thickening in the pulp mill is recommended.

L.E.W.

HERMANNE, L. Interpretation of the mechanical behavior of rayon. Textile Research J. 19, no. 2:61-72 (February, 1949).

Based on physical measurements of fibers, particularly of viscose rayon, a working hypothesis is presented for interpreting the mechanical behavior of cellulose. Load-elongation diagrams for dry and wet rayon are utilized to characterize the essential mechanical properties. The total deformation is made up of an initial elastic deformation (partly instantaneous and partly delayed) and a permanent deformation extending beyond the yield point and, for a given load, reaching a final value asymptotically with time. Plastic flow is not involved, for then the deformation would proceed at a finite rate. In the wet state the modulus of deformation is lower and the ratio of elastic to permanent deformation is distinctly higher than in the dry state. In terms of fiber structure, the mechanical properties are related principally to the amorphous regions. In the crystalline areas deformation entails exclusively an increase in potential energy by moving atoms farther apart and distorting valence angles (maximum elongation 5%), but in the amorphous regions the chains are less ordered and have a certain degree of freedom or micro-Brownian movement. There is a tendency to establish the most probable statistical distribution and the entropy of the system is a function of the probability of this distribution. In the moist state, the penetration of water molecules into the amorphous regions reduces the cohesive forces of secondary valences so that the mobility is greater and the deformability is markedly increased. The load-elongation diagram for wet cellulose is shown to be similar to that for stretched vulcanized rubber (with hydrogen bonds playing the role of the sulfur atoms), but the calculation of entropy values is more complicated and offers even greater difficulties. By an analogy between mechanical and electrical coupling in series and parallel arrangement, an equation is developed for the deformation, combining the energy and entropy mechanisms. The relationship is also expressed in thermodynamic terms, and again as an equation of state analogous to the van der Waal's equation. Here cellulose bears a relation to rubber similar to that which a van der Waal's gas bears to an ideal gas. 10 references. M.A.H.

VERMAAS, D., and HERMANS, J. J. The swelling of cellulose xanthate gels in dilute salt solutions. Rec. trav. chim. 67, no. 12: 983-97 (December, 1948). [In English]

A theory is developed which relates the degree of swelling of a polymer network bearing ionic groups with the electrolyte concentration in the swelling medium. The theory is based on the assumption of an electrolyte distribution according to a Donnan equilibrium between the gel and the surrounding liquid on one hand, and on the application of a modified Flory-Rehner equation to the dependence of the free energy of dilution on the degree of swelling on the other. The theory is applied to the swelling of cellulose xanthate gels in neutral salt solutions. 18 references. C.J.W.

REPORTS—PREPARATION

MICHAELSON, HERBERT B. Techniques of editorial research in electrical engineering. J. Franklin Inst. 247, no. 3: 245-53 (March, 1949).

In every phase of research and development, there is a well defined need for searching and interpreting the technical literature. The author refers to this neglected aspect of research as "editorial research" and, with particular reference to the field of electrical engineering, discusses, in turn, some of the methods of conducting a literature search, of selecting and arranging the useful material, and of writing the survey in an acceptable form. 69 references. E.S.

RESEARCH

AMBRIDGE, D. W. Research in the Canadian pulp & paper industry. Pulp Paper Mag. Can. 50, no. 3: 117-20 (Convention, 1949); Paper Trade J. 128, no. 6: 14-16 (Feb. 10, 1949).

The author emphasizes the lack of research in the Canadian pulp and paper industry, outlining the reasons for this state of affairs and the possibilities for gradually improving the situation. The building of an adequate research staff is going to take years but further delay in making a start is not going to bring the required results. E.S.

RESEARCH LABORATORIES

EKLUND, Bo. The organization and work of the Swedish Forest Research Institute. Unasylva 2, no. 5: 243-51 (September-October, 1948); Pulp Paper Mag. Can. 50, no. 3: 250, 252, 254, 256, 258, 260, 262 (Convention, 1949).

At the end of the 19th century a project was developed for setting up a central research body in Sweden for forestry under state administration. In 1902, the Förstliga Försöksanstalten, the name of which was shortly after changed to Statens skogsförsöksanstalt (Swedish Institute of Experimental Forestry), was established. In 1912, the Institute's activities were enlarged and funds appropriated for a new building which was occupied in 1915. Proposals for a new organization were approved in 1939, but war prevented any developments until 1944. Staff and resources were increased, a new building was erected, and the old building was changed and enlarged; further additions to the organization were made in 1945 and 1946. During the reorganization, the name was changed to Statens skogsforskningsinstitut (Forest Research Institute). The Institute works on forest conservation and keeps running inventories of the country's available forest resources. The organization and activities of the Institute as a whole are described, and also of the Forestry, Statistical, Botany and Soils, Genetic, and Zoologic Divisions. R.R.

PATRA JOURNAL. PATRA's new Research Centre. PATRA Journal 12, no. 1: 2-10, 14-25 (January, 1949).

Following a brief summary of the formal opening of the new PATRA Research Centre, the text is given of the speeches presented at that occasion by the Duke of Gloucester, John J. Astor, C. H. Clarke, Edward Appleton, and William L. Bemrose. R.R.

RIDDELL, G. L. PATRA's package research. Modern Packaging 22, no. 7: 123-5 (March, 1949); *cf.* B.I.P.C. 19: 424.

A discussion is given of the activities of the Printing, Packaging and Allied Trades Research Association in England and the new laboratory at Leatherhead. The progress made in research in 1947-1948 is summarized. R.R.

ROSIN

WALSH, J. M. The rosin and rosin size outlook for 1949. Paper Trade J. 128, no. 8: 102 (Feb. 24, 1949).

The price of rosin size for the paper industry moved up and down in accordance with the Savannah market. Demand from the paper trade was good, as the industry operated close to 100% capacity during the entire year. It is estimated that production of gum and wood rosin will be

approximately 10% higher than in 1947, when it amounted to 1,990,831 drums. Prospects for 1949 are good, although the Government has not yet named the support price for the new crop. The tendency in the market for the lower grades of wood rosin (FF and lower) has been rather weak because of heavy production and lack of exports and consumption. E.S.

SETUP BOXES

ANON. String-opener for Pabst-ett. Modern Packaging 22, no. 7: 80-1 (March, 1949).

A new tamperproof paper container for cheese is opened by pulling an attached string, which tears the wrap-around label and separates the top and bottom segments. A two-piece carton with a rigid inner collar and a printed, wax-treated, cellophane overwrap is used for two-pound loaves of the cheese. Illustrations are given of both cartons. R.R.

MORRIS, DURWARD M. Setup paper box trainers and supervisors. Shears 67, no. 674: 37, 39-40 (February, 1949).

The author recounts the experiences of the Wayne Paper Box and Printing Corp. while setting up a training program. The first course, organized for those selected as future trainers, consisted of the fundamental principles of all movements, breakdown of jobs, record keeping to show the trainee each day just how he compares with the average employee, a definite pattern by which all employees are to be trained, and actual demonstrations. At the beginning of the program, the percentage of employee turnover for 12 months was 210% and the average training cost was $65.59 per person trained; in 1948, the turnover was reduced to 97% and the cost to $31.13. In the same year, the dollar volume in the setup-box department increased about 10% over 1947, the average hourly earning in a piece-work incentive system rose 15.5%, and the actual payroll decreased by $14,000. As the training program has progressed, duties have been added to those originally given to trainers and supervisors. The company is now investigating the potentialities of aptitude testing. R.R.

SHIPPING CONTAINERS

ANON. Packaged for hobbyists. Modern Packaging 22, no. 7: 101, 158 (March, 1949).

"Craft-packs," new sales units of Masonite's tempered Presdwood hardboard, are on the market for use by hobbyists. The cartons show many items which can be made with the contents; an order blank is enclosed for detailed plans on building all the articles illustrated. Die-cut windows permit inspection of the board without its removal from the package. The cartons are 0.03 kraft-lined chipboard printed by letterpress in two colors. Packing is done by hand. Four sizes of Presdwood pieces are available in these packs. R.R.

COOPERATIVE FOR AMERICAN REMITTANCES TO EUROPE, INC., *New York*. CARE uses 30,000 boxes per day. Am. Boxmaker 38, no. 3: 13-15 (March, 1949).

CARE's food packing plant in Philadelphia uses 150,000 cartons per week for shipping packages to 14 countries in Europe and the Orient. Food packages comprise 90% of all CARE shipments, which have included 7½ million overseas packages in three years. Plant facilities in Philadelphia make possible the handling of 15 carloads and 20 truckloads of supplies per day; loading on ships is at the rate of 1500 packages per batch per hour. In the plant, the cartons are moved along the assembly

line on conveyor belts, each outer waterproof carton containing two smaller boxes and being securely bound with steel strapping at the end of the line. Each food package is on the assembly line for about 10 minutes. R.R.

SEALRIGHT COMPANY, INC., *Fulton, N.Y.* Peony roots in plastic coated can. Am. Boxmaker 38, no. 3: 20 (March, 1949); Paper & Paper Products 90, no. 13: 14 (March 20, 1949).

To avoid the high moisture loss which kills peony roots, they are now being packaged in plastic-lined fiber cans, some of which have film-covered windows. The Thermo-king container is printed in color to show the shade of the flower. R.R.

VICTORY CONTAINER CORPORATION, *New Hyde Park, N.Y.* Snap open shipper. Modern Packaging 22, no. 7: 109-11 (March, 1949).

A new type of corrugated shipping container is prestapled and folded flat; it snaps open ready for use and is attracting considerable attention as a great time and labor saver, especially in wholesale produce prepackaging. Users report 50-75% reductions in shipping-packaging labor costs and find the cartons strong enough for re-use in some cases. The ingenious folds are made on 45° angles. Popular styles are described, including a bottom-fold model and two end-fold containers. All styles have solid bottoms and all except one have center-stapled end walls with inner reinforcement. They can be constructed of regular corrugated up to 275 test. The minimum size is 6 × 6 inches, and largest 35 × 24 inches. On the average, the cost is competitive with that of conventional styles. Illustrations are included. R.R.

VINE, W. H. Packaging and rail transport. Brit. Packer 11, no. 2: 24-8, 34 (February, 1949).

Packaging must withstand normal treatment during handling and transportation, afford protection against the weather, and/or give reasonable security from pilferage. British railroads carry goods in three classes of risks: carrier's risk, owner's risk which generally offers a reduced transportation rate, and damageable goods not properly protected by packing. Provisions contained in the "General classification of merchandise" are briefly considered, including the main essentials for fiberboard cases. Shipping containers should not be marked as to their contents; the necessary shipping information should be given in bold black characters on a plain background. Paper labels should be applied with good paste or gum and allowed to dry before shipping; card labels should be tacked onto wooden cases and tie-on labels fastened with wire or strong twine. For loads of a ton or more with a single destination British railroads provide a container service which makes available a demountable car body, either open or closed. A discussion of rail-handling techniques and the employment of packaging experts concludes the article. R.R.

SHIPPING CONTAINERS—EXPORT PACKAGING

ANON. Task group maps export packing standards. Shears 67, no. 672: 48 (February, 1949); Packaging Parade 17, no. 194: 81 (March, 1949).

At a recent meeting of over 600 representatives of major export shipping associations and concerns, a co-operative movement for the improvement of packaging standards was begun to reduce the huge losses caused

by inadequate export packaging. Shippers were warned that they would lose export trade to increasingly stronger foreign competition unless higher standards were set up. A nine-member committee was appointed, representing shippers, carriers, and underwriters. R.R.

SHIPPING CONTAINERS—TESTING

MATHER, GLENN. New military test standards for overseas type fibre drums. Shears 67, no. 674: 57-8 (February, 1949); Packaging Parade 17, no. 194: 81-2 (March, 1949); Fibre Containers 34, no. 2: 46, 51-2 (February, 1949).

The National Military Establishment Specification JAN-D-111, drums, fibreboard (overseas type), recently issued, introduces new and more severe performance testing data and standards. The compression, drop (both dry and wet), and ply separation and bonding tests are briefly described. The specification designates Type I drums for powdered, granular, and flaked materials and Type II for hot-poured materials which solidify on cooling (Class A for contents with a minimum melting point of 120° F. and Class B for those with a minimum melting point of 160° F.). Each is described. Other requirements of general interest are given. R.R.

ROYCE, CLINTON K. Developments in military packaging specifications. Fibre Containers 34, no. 2: 68, 70 (February, 1949); *cf.* B.I.P.C. 19: 505.

This article is essentially the same as the earlier one. R.R.

SLIME PREVENTION

BUCKMAN, STANLEY J. Microorganism control in mechanical pulp and its relation to paper manufacture. Tappi 32, no. 3: 129-44 (March, 1949).

Information is presented in support of the conclusion that the growth of micro-organisms in wet mechanical pulp (50% moisture content) can be economically controlled for a storage period of one year or more by treatment with BSM-11B, which is a 10% solution of phenylmercuric acetate. The treatment was added to the white water with the system closed so that very little white water was discharged. Slime control was achieved throughout the pulp system by the combined effect of the treatment and operation at a temperature of about 55° C. The other advantages of operation at higher temperatures thus were realized without a sacrifice in pulp quality. The importance of micro-organism control in mechanical pulp from the standpoint of the losses caused by slime in paper machine operations is emphasized, particularly from the standpoint of pulp stored as slush stock in storage tanks, and as wet sheet or lap stock. The loss of fiber in badly decayed pulp, the difficulty of dispersing partially decayed pulp, and odor, as well as darkening in color caused by the growth of micro-organisms, are all factors which cannot be ignored. However, the major losses result from the contribution of the infection in the pulp to the growth of slime throughout the paper-machine systems. The primary general classes of losses caused by slime in paper-machine operations are: lost production time; decreased equipment performance; loss of heat, fiber, water, and various chemicals; decreased equipment life, particularly felts; and loss of finished product. The more important individual components of these losses are reviewed briefly and information is presented on methods for their evaluation, including a unit for measuring the rate of slime accretion in

paper-machine systems. A macroanalytical method for the determination of mercury in pulp and paper (containing from 1 to 1000 parts of mercury per million) is outlined. 40 references. E.S.

FALLS CHEMICAL PRODUCTS COMPANY, *Oconto Falls, Wis.* Control with P M 32 Powder. Paper Mill News 72, no. 11 : 40 (March 12, 1949).

The possibilities of P M 32 Powder, an organic mercury compound, as a slimicide in the pulp and paper industry and as a preservative for glues, proteins, starches, wet lap pulps, felts, etc., are mentioned. E.S.

GALLOWHUR CHEMICAL CORPORATION. Puratized SC and Gallicide for slime control. Paper Mill News 72, no. 11 : 44 (March 12, 1949) ; *cf.* abstract below.

A comparison of the physical constants, and bacteriostatic and fungistatic values of Puratized SC and Gallicide is made. The latter has been developed recently to meet the need for a quick-acting slimicide which may be used effectively close to the machine. Puratized SC is of comparatively slow solubility in cold water. Methods of packaging are described and directions for application are given. E.S.

GENERAL DYESTUFF CORPORATION. Balanced slime control. Paper Mill News 72, no. 11 : 22 (March 12, 1949) ; *cf.* B.I.P.C. 18 : 788.

This is essentially the same information as presented in the previous reference. Mention is made of the use of liquid Gallicide (phenylmercury monoethanolammonium acetate) in the place of Puratized SC (phenylmercuric lactate) when a quick-acting material is desired. The two organic mercury compounds may be used individually or in conjunction, depending upon mill conditions. E.S.

GILLASPIE, ATHEY G. Consideration of slime control by chemical toxicants. Paper Mill News 72, no. 11 : 18, 52 (March 12, 1949).

The author discusses the organomercurials (Merfenelopes) as slimicides for different types of pulp, adsorption phenomena by unbleached pulp presenting a special problem for maintaining an inhibiting concentration of the toxicant. E.S.

MCCOY, E. F. Microbiological methods of slime control. Paper Mill News 72, no. 11 : 19-20, 42 (March 12, 1949).

After briefly referring to the main sources of contamination in a pulp and paper mill system, the author discusses the details to be investigated in an engineering survey before recommendations for any type of disinfectant can be made. These details should include a flow diagram, and data on mill equipment, raw materials and types of furnish used, water consumption rates, points and quantities of white-water sewerage, system temperatures, and pH. A microbiological survey must then be made on mill samples consisting of fresh water, white water, pulp slurries, slimes from various points, and materials used in the furnish. From these data a report on the types of organisms present should be prepared. After the information from engineering and microbiological surveys has been collected, it should be correlated and interpreted in order to determine the type of chemical disinfectant likely

to give the best slime control, the point or points of application which will be most effective, and the dosage rate needed to control the organisms responsible for the slime. After a program has been instituted, regular periodic inspections and microbiological analyses must be made to correct for changing conditions. E.S.

McKEE, WILLIAM N. Continuous feeding of PMAS in paper mill systems. Paper Mill News 72, no. 11: 28 (March 12, 1949).

PMAS, a color- and odorless slimicide, is a stable water solution containing 10% phenylmercuric acetate solubilized in an organic complex. Most economical results are obtained in mills using continuous feeding systems. As a general rule, the amount of PMAS needed is calculated as 8 oz./ton less the percentage of recycled water. However, local conditions and operating experience will determine the proper dosage in most cases. E.S.

MAGNUS CHEMICAL COMPANY, INC. Slime removal. Paper Mill News 72, no. 11: 41-2 (March 12, 1949).

The main function of Magnus Slime Remover is the penetration, loosening, and dispersion of slime deposits. Directions for application are given; its most effective use is based on a routine schedule. E.S.

MARTIN, R. B. Effective slime control. Paper Mill News 72, no. 11: 28 (March 12, 1949).

The author emphasizes in particular the effect of changes in mill operation on slime and bacterial control, which in the past has frequently given rise to a mistaken view of an apparent immunity building up on the part of the infecting micro-organism. Such changes may require appropriate alterations in chemical applications, or the surviving organisms may be encouraged to develop at an accelerated rate, without having attained immunity. E.S.

ROGERS, C. H. Establishing a non-toxic germicide. Paper Mill News 72, no. 11: 24, 26, 42 (March 12, 1949).

The author gives an over-all picture of the type of testing required to establish a germicide as a nontoxic substance. Bearing in mind that toxicity values are relative, tests have shown that Vancide 32 (β-hydroxyethylpyridinium-2-benzothiazyl sulfide) (I) is safe from acute and chronic toxicity standpoints as indicated by results on normal test animals. Patch tests on humans caused no dermatitis or sensitization. It may be concluded, therefore, that (I) should not be homicidal and may safely be used as slimicide in mills making paper and board products used for wrapping foodstuffs. Data showing the effectiveness of (I) for slime control in a board and glassine paper mill are included. E.S.

STAFFORD, R. The use of calcium hypochlorite solution for slime control. Pulp Paper Mag. Can. 50, no. 3: 164-6, 178 (Convention, 1949).

The author describes the problems associated with slime formation and the method of slime control being used at the sulfite mill of the Spruce Falls Power and Paper Co., Ltd., Kapuskasing, Ont. Slime presents a problem to the sulfite mill because of its tendency to clog lines and screens, thus reducing screening capacity, and also because of the off-grade pulp which results when slime fragments break away and become mixed with the stock. Previous to the chemical treatment of stock lines with calcium hypochlorite solution, the screen-room stock system was cleaned mechanically by scraping

and sluicing. This method was expensive and inefficient as compared with the present method. It could be done only on weekend shutdowns without incurring a loss in production and a considerable amount of off-grade pulp was produced for several shifts after the start-up because of loosened slime fragments. The use of calcium hypochlorite solution makes it possible to treat the system during the week without loss of production and results in much better slime control. As a result only a very small amount of off-grade pulp is produced on the start-up shift and the efficiency of the screens has been increased. The chemical treatment of slime has also made it unnecessary to bring in large maintenance and clean-up crews for the weekend clean-up. E.S.

STARCH

BARNETT, H. R. Potato starch production in the United States. Paper Trade J. 128, no. 8: 90, 101 (Feb. 24, 1949).

The author reviews the potato starch resources in the United States prior to the second world war (domestic production from Maine and imports, chiefly from Holland). In 1937, the Government began its program of potato price support, which led to vastly expanded production, not only in Maine, but in every other state of the union. During the war, a number of starch plants in Maine were enlarged and modernized; some destroyed by fire were replaced. The present 20 Maine plants can produce over 50,000,000 pounds; the plants vary in size, age, type of equipment, and technical and financial resources. A few can undoubtedly produce good starch, but the smaller old-fashioned units could not meet rigid specifications. An entirely new industry started in Idaho, where the first plant began operation in 1941. The present six Idaho plants could produce at least 32,000 tons annually. Both Maine and Idaho plants are at present shut down or operating part-time to avoid an accumulation of excessive starch inventories. The relatively large and modern Idaho plants are making notable improvements in uniformity and general level of quality of their product. Several plants are co-operating to establish a specification to confine variations to narrow tolerances. It is estimated that the U.S. consumption is now approximately 58,000,000 pounds annually, as compared with 30,100,000 pounds about 10 years ago. Approximately one third of this amount is taken by the paper industry for tub sizing, coating, calendering, and beater sizing. Ample domestic sources and reasonable prices should stimulate investigations for developing further applications in the industry. It should be understood that potato starch cannot always be used to replace other sizing materials without variations of procedures. However, research by the starch producers and laboratory and production men in the paper industry will undoubtedly lead to new developments. The subject is certainly worth a thorough exploration. E.S.

STRASSER, WILLIAM W., JR. The tapioca, corn and potato starch situation in review. Paper Trade J. 128, no. 8: 88 (Feb. 24, 1949).

The outlook and price situation for tapioca, corn, and potato starch for 1949 are reviewed. E.S.

STEAM POWER

ANON. Developments in steam power engineering between 1940-1946 (with particular reference to American conditions). Das Papier 2, no. 23/24: 445-7 (December, 1948) [Reprinted from *Technische Rundschau,* Bern, no. 29, 1948] [In German]

Significant trends and developments in boilerhouse construction during the indicated period are reviewed. E.S.

ANON. English (Imperial), American (U.S.A.) and German (or Swiss) thermal units for steam boiler operation and heating. Das Papier 2, no. 23/24: 447-8 (December, 1948) [Reprinted from *Technische Rundschau,* Bern, no. 29, 1948] [In German]

Thermal units and the figures used for actual and equivalent evaporation and rated boiler horsepower are discussed; a table is included presenting the equivalent figures for the British thermal unit (B.t.u.), Centigrade heat unit (C.h.u.), and the international kilogram calorie (kcal.). E.S.

ANON. Here's a small boiler plant that doesn't need to make any apologies. Power 93, no. 3: 114-17 (March, 1949).

An illustrated description is given of the new boilerhouse of the Jackson Box Co., Norwood, Cincinnati; the plant makes corrugated board and cuts, folds, and prints it for boxes and cartons. Electricity is purchased. The new boiler plant houses two oil-fired boilers, either of which can carry the normal plant load. The principle users of process steam are the two corrugating machines, with a smaller amount going to the gluing and taping operations and miscellaneous uses. Steam is also supplied to unit heaters and for hot water service. Details of steam distribution and auxiliary services are given. E.S.

TURNER, M. W. Pioneering with a 60,000 lb. steam generating plant fired by a Detroit Rotograte spreader stoker on low grade lignite. Pulp Paper Mag. Can. 50, no. 3: 149-52 (Convention, 1949).

The Pine Falls mill of the Manitoba Paper Co. Ltd. is a two-machine newsprint mill, producing its own groundwood and sulfite and making about 350 tons of newsprint per day. On account of curtailment of hydroelectric power, the mill was faced in 1946 with the necessity of installing additional steam-generating capacity. The two conveniently available coals from Canadian sources were Saskatchewan lignite and Alberta bituminous coal. The boiler and stoker selected for the most efficient burning of this type of fuel were a B & W Type G integral furnace boiler and a continuous ash-discharge Rotograte spreader stoker. The installation is described in detail; the results obtained with Bug-Dust lignite (screenings from graded lignite) have thus far been even better than anticipated. E.S.

STRAW

LATHROP, ELBERT C. Wheat straw for improved paper and board products. Pulp Paper Mag. Can. 50, no. 3: 167-78 (Convention, 1949); *cf.* B.I.P.C. 19: 118-19, 304.

The practicability of producing straw pulps suitable for various types of paper and board is discussed. Co-operative efforts of the strawboard industry, the farm equipment industry, and the Northern Regional Research Laboratory have brought about improvements in procurement of straw and in technical and process control of strawboard manufacture. The increasing availability of relatively low-cost one-man balers and the co-operative educational campaign on straw collection are bringing the straw supplies ever nearer to the mills. The large annual straw production indicates no possibilities of straw scarcity in the foreseeable future—in contrast with the pulpwood situation. Data are presented to show the technological and economic feasibility of producing high yields of strong, easy-bleaching straw pulps for blending with other papermaking pulps in the manufacture of fine

specialty papers. No major changes in present pulp mill equipment are required to produce this straw pulp. The advantages of blending straw pulp with other papermaking pulps are discussed. Pilot plant production of insulating building board from straw is described. A superior product is made by blending long-fibered straw pulp with regular lime-cooked pulp to form an insulating building board with increased ruggedness, particularly impact strength. The increase in paper and board consumption, attendant upon the general raising of living standards the world over, should result in increased utilization of annual crop residues. 20 references. E.S.

SULFATE MILLS

ANON. Latest development in new sulphate pulpmill project. Western Pulp and Paper 2, no. 2: 11 (February, 1949); *cf.* B.I.P.C. 19: 507.

It has been decided to build the bleaching unit simultaneously with the construction of the Nanaimo sulfate pulp mill; the mill was first planned to produce unbleached pulp, with a bleaching unit to be added later. E.S.

DEAN, BILL. 150 tons per day kraft from sawmill refuse. Am. Boxmaker 38, no. 3: 21-2 (March, 1949).

The new Springfield, Ore., plant of the Weyerhaeuser Timber Co. will produce 150 tons of sulfate pulp per day from sawmill and logging waste. The Rice Barton board machine will make 12-foot widths of corrugating medium and kraft liner board at a maximum speed of 1000 lineal feet per minute. R.R.

SULFITE PROCESS

POTTER, G. J. C. A review of the literature of the sulphite process, August 1947-August 1948. Pulp Paper Mag. Can. 50, no. 3: 312, 314, 316-18 (Convention, 1949); *cf.* B.I.P.C. 18: 553.

Continuing the previous review, the literature on the sulfite process up to the discharge of the pulp from the digesters is covered under the headings: general, acid making, cooking liquor, and cooking process, circulation, etc. 30 references. E.S.

SWELLING AND HYDRATION

KASBEKAR, G. S. Swelling of cellulose in solutions of neutral salts: a historical review. Indian Pulp and Paper 3, no. 6: 237-41 (December, 1948); *cf.* B.I.P.C. 18: 475-6.

The author presents a summary of work done on the swelling of cellulose in neutral salt solutions, beginning chiefly with the studies of Mercer in the middle 1800's and ending with those of Kasbekar and Neale, reported in 1947. 62 references. R.R.

TALL OIL

GORDON, E., and RAGOT, S. Hydrogenation of tall oil. Bull. mens. ITERG (Inst. tech. études et recherches corps gras) no. 4: 32-4 (1948); C. A. 42, no. 16: 6141 (Aug. 20, 1948). [Abstract only available]

Tall oil having an acid number of 178, a saponification number of 184, an iodine number of 125, and a titer Dalican of 6°, was hydrogenated with 3% Raney nickel at 30 atmospheres' pressure of hydrogen and at tempera-

tures of 75, 150, and 300° C. for 2, 3, and 5 hours, respectively. The finished products showed, respectively, acid numbers of 165, 142, and 118; saponification numbers of 182, 181, and 142; iodine numbers of 62, 59, and 47; melting points of 55, 57, and 73° C., and penetrations (arbitrary comparative values) of 6, 10, and 20. A temperature of 90° for 2 hours was finally adopted in order to obtain a light colored product which proved very satisfactory for the manufacture of soap. The resin acids of tall oil are not notably hydrogenated even at 300°, a fact which contrasts with the behavior of other resin acids which are easily hydrogenated at 240°. R.R.

TANNING

GUSTAVSON, K. H. Reaction of lignosulfonic acid with collagen. A note. J. Soc. Leather Trades' Chemists 32: 287-8 (1948); C. A. 42, no. 21: 8508 (Nov. 10, 1948). [Abstract only available] *cf.* abstract below.

In previous work, vegetable-tanned hide powder was dried at room temperature before treatment with lignosulfonic acid. Drying at room temperature reduces combining capacity of wattle-tanned hide powder toward lignosulfonic acid by about 40%, while further drying at 100° reduces the combining capacity by 80%, compared with nondried leather. Combining capacity toward hydrochloric acid is reduced by only 2% by drying at 100°. The dried materials were rehydrated for 24 hours before testing. Secondary changes in the collagen tannin compound on drying are indicated. E.S.

GUSTAVSON, K. H., and TOMLINSON, J. Reaction of high molecular lignosulfonic acid with collagen. J. Soc. Leather Trades' Chemists 32: 165-75 (1948); J. Am. Leather Chemists Assoc. 43, no. 10: 643-4 (October, 1948). [Abstract only available] *cf.* B.I.P.C. 19: 356.

Comparative data on the fixation of hydrochloric acid, naphthalenesulfonic acid, and the high molecular fraction of lignosulfonic acids by ordinary and vegetable-tanned collagen show that the degree of maximum fixation of hydrochloric acid by vegetable-tanned hide powder is about 90% of the amount fixed by untreated hide powder, whereas the fixation of the lignosulfonic acid by the tanned collagen only amounts to 30 to 40% of the value of the fixation by ordinary collagen. The reversible and irreversible fixation of high molecular lignosulfonic acid has been further investigated. The main findings are that the irreversibly fixed acid combines with collagen stoichiometrically, the combining equivalent weight being identical with the equivalent weight of the original acid in solution or about 500. Since the molecular weight of this fraction is in the range of 5000 to 10,000, it follows that from 10 to 20 sulfonic groups are present in the molecule. In the irreversible fixation all or the greatest part of the sulfonic groups react with the basic protein groups, whereas in the reversibly fixed fraction of sulfo acid, only a small fraction of the sulfonic groups are inactivated by the basic groups of collagen. The drastic decrease in the fixation of high molecular lignosulfonic acid by vegetable-tanned collagen is explained by steric hindrance of the large sulfo acid anion and less favorable steric conditions present in the tannin-collagen structure for multipoint interaction of the numerous sulfonic acid groups with the free basic protein groups. The stabilization of the lignosulfonic acid-collagen structure is best explained by such a multipoint attachment of the large anion of lignosulfonic acid on the protein chains. Auxiliary co-ordinate stabilization of the primarily electrovalently attached sulfo acids is not indicated. Similar reaction mechanisms of sulfo acids of dyestuffs are discussed. E.S.

TEXTILE INDUSTRY AND FABRICS—TESTING

Bogaty, Herman. Deterioration of cotton textiles exposed to the weather. Am. Dyestuff Reptr. 38, no. 6: 253-9 (March 21, 1949).

The data presented were obtained during an investigation of some aspects of "tropical" deterioration of cotton textiles. Changes in breaking strength and in the fluidity of a cuprammonium solution of the cotton were used to evaluate the degradation of the exposed samples. It was found that cotton fabrics treated with copper naphthenate deteriorated more rapidly on outdoor exposure than untreated fabrics. Free copper sulfate in general contributed to the acceleration of tendering. Copper naphthenate, laboratory-prepared from copper acetate, was a less effective fungicide with respect to soil contact than commercial copper naphthenate. Phenyl salicylate (salol), an ultraviolet-radiation absorber, neither inhibited nor decreased the degradation of cotton exposed to weathering. Pyrogallol gave some promise of decreasing the weathering degradation of fabrics; further work with it is indicated. The role of the agencies comprising "weather" requires further elucidation. Fabrics treated with copper phenylnaphthenate deteriorated at about the same rate as those treated with copper naphthenate in weathering exposures but were somewhat more resistant to soil contact. 5 tables and 11 figures. R.R.

Dart, S. Leonard, and Peterson, L. E. A strain-gage system for fiber testing. Textile Research J. 19, no. 2: 89-93 (February, 1949).

A precision research instrument for the measurement of stress-strain-time properties of textile materials is described, which was constructed in the research laboratory of the American Viscose Corporation. Classification of this instrument as a research tool rather than as a routine testing instrument allows more flexibility in operating conditions. It is of the constant-rate-of-extension type for use on all textile materials from single filaments to fabrics. The instrument consists essentially of a constant speed drive, a Statham gage, and a Brown recording potentiometer. A few illustrations of its many possible applications are given. 9 figures. E.S.

Rowley, B. C., and Sonnino, M. Testing apparatus for the evaluation of fire-resistant textiles. Am. Dyestuff Reptr. 38, no. 5: 201-4 (March 7, 1949).

The authors describe an apparatus in which tests on the fire resistance of textiles can be carried out conveniently and reproducibly and report on the representative results obtained with it. The apparatus is designed to test samples in a vertical, horizontal, or 45° position. The tests are performed in a $12 \times 12 \times 24$-inch cabinet provided with a top vent and bottom air inlets. The open front, through which samples are positioned, is closed with a sliding glass door during operation. The 8.5-inch square samples for the horizontal or 45° test are put in holders which hold them firmly on all four sides under a slight and (for the same fabric) reproducible tension. The holder is placed on a supporting frame on built-in supports in the cabinet. The 13×2-inch samples for the vertical test are held at the bottom corners by a spring clamping device and at the top by rollers built into the cabinet. The gas system includes a gasometer and a bubble tank. For the vertical test a Bunsen burner is used with a completely luminous flame; a microburner is used with a luminous-tipped flame for the horizontal and 45° tests. A timer and two selector switches for controlling the burners are mounted on a panel board. The results of tests conducted on cotton cloth

in two laboratories show that the reproducibility of operation of the apparatus is satisfactory. Although definite test results are not yet available, the instrument promises to be suitable for the evaluation of flameproofed paper; it conforms to TAPPI Standard T-461 m-45 and ASTM method D—777. 5 figures. R.R.

WILHELM, RICHARD H., and SMITH, JAMES BOYD. Transmittance, reflectance, and absorptance of near infrared radiation in textile materials. Textile Research J. 19, no. 2: 73-88 (February, 1949).

The transmission of infrared energy through layers of various textile fabrics was determined. An R-40 lamp was used as the infrared source (wavelength maximum at 9700 A.) and a thallium sulfide photoconductance cell was used as the detector. Measurements were made on cotton, viscose rayon, cellulose acetate rayon, and woolen and worsted materials. Variables included nature of fiber, thickness of textile pile, weight and construction of fabric, moisture content, and dyeing of fiber. For each material and for each condition, the transmittance was measured for successive layers of fabric piled one upon the other until the limit of sensitivity of the detector was reached. It was found that the nature of the fabric fiber affected transmittance, whereas construction of the fabric did not, and that the important variable was the average number of fibers in the path of illumination. Further, the transmittance increased to a maximum and then decreased as the moisture content of the fabrics was increased from dryness to a high value and, finally, it was determined that dyes markedly affected transmittance. A theory of transmission based upon Stokes' equations for the optics of a pile of parallel plates was found to describe satisfactorily the experimental data for textile fabrics. The theory also leads directly to reflectance and absorption formulas which make possible the estimation of these properties from constants evaluated in transmittance measurements. These optical relationships are not limited to infrared energy, but their application in this wavelength range is of interest in radiation drying. Moreover, the behavior of light or of radiant heat is of interest for other materials which, like textiles, are in the form of sheets and are composed of particles or strands that scatter the radiation. 17 references. W.E.S.

VANILLIN

PEARL, IRWIN A., and BEYER, DONALD L. Reactions of vanillin and its derived compounds. VII. Some new esters of vanillic acid and related acids. J. Am. Chem. Soc. 71, no. 3: 1066-8 (March, 1949); *cf.* B.I.P.C. 18: 872-3.

A large number of new esters of vanillic acid and the closely related acids, orthovanillic and 5-chlorovanillic, were prepared. The inhibiting concentrations of these esters were determined for representative micro-organisms. E.S.

WOOD

STAMM, ALFRED J., and TARKOW, HAROLD. Wood, a limited-swelling gel. J. Phys. & Colloid Chem. 53, no. 2: 251-60 (February, 1949).

The authors show that wood behaves as a gel of the limited-swelling type. The restraint to unlimited swelling results from the peculiar type of orientation of the micelles in the outermost and innermost layers of the cell wall. It is also shown that, on loading the wood substance with various materials, the volume of many species of wood increases by an amount equal to the

volume of the inert material. Balsa is an exception. Here the increase in volume, on adding a bulking agent, may be as much as three times the volume of material placed in the wood substance of balsa. The bulking effects make possible the dimensional stabilization of wood for, although the dry dimensions of the wood are increased, the water-swollen dimensions are not affected. 14 references. E.S.

WOOD—EXTRACTIVES

HURD, CHARLES D., and EDWARDS, O. E. Reactions of dehydroperillic acid. J. Am. Chem. Soc. 71, no. 3: 1016 (March, 1949); *cf.* B.I.P.C. 19: 511-12.

Derivatives of dehydroperillic acid (obtainable from the heartwood of western red cedar) are reported. The conjugate unsaturation in the structure of these compounds suggests ready polymerizability which was not experienced in practice. E.S.

LINDBERG, BENGT. Glucosides of pinosylvin and its monomethyl ether. Acta Chem. Scand. 2, no. 10: 872-7 (1948). [In English]

The mono- and di-β-glucosides of pinosylvin (I) and the β-glucoside of pinosylvin monomethyl ether (II) have been prepared; the monoglucoside of the latter could not be obtained in a pure state. The biological activity of the slightly water-soluble (II) and the readily soluble (I) were tested; neither of them was found to possess any fungicidic properties for wood-destroying fungi (*Pullularia pullulans* and *Polyporus annosus*). E.S.

WOOD OPERATIONS

ANON. Advanced methods in Texas; a visit to Champion's woods operations. Pulp & Paper 23, no. 3: 83-4, 87 (March, 1949).

An illustrated description is given of the woods operations carried on by the Champion Paper & Fibre Co. near Huntsville, Texas. About 100,000 cords of wood annually come from the subsidiary Texas Forest Farms, Inc.; the remaining 60% comes from independent contractors. The organization hopes to bring its fee ownership up to 300,000 acres. All company lands are under the co-operative fire protection of the Texas Forest Service. The equipment used for road work and hauling and the company's efforts toward forest waste utilization are briefly considered. R.R.

ANON. Bowater's hits wood costs; new equipment halves logging season. Pulp & Paper 23, no. 3: 71, 74, 76-7, 79, 81-2 (March, 1949).

By replacing 600 of its 800 horses with mechanized equipment, Bowater's Newfoundland Pulp & Paper Mills is able to cut and haul wood with about the same summer and fall crew, shortening the delivery season by almost half and effecting a significant decrease in wood costs. Improved Hyster arches mounted on D7 Caterpillar and TD18 International tractors are used. The organization has ownership or cutting rights to timber on over 25% of the island's area. Wood is brought to the mill by narrow-gage railway, streams, steamer, and towboat. Large Lorain cranes are used for loading, unloading, and construction work. Illustrations are included. R.R.

SILVERSIDES, C. R. Bearing capacity of ice. Pulp Paper Mag. Can. 50, no. 3: 248 (Convention, 1949).

Data are given on the loads which ice is capable of bearing, as well as directions for strengthening a road surface over ice. E.S.

TURNER, W. B. South wood handling show: Camp Mfg. Co. methods demonstrated. Pulp & Paper 23, no. 2: 76, 78, 80 (February, 1949).

The loading and unloading of pulpwood as practiced at the Camp Manufacturing Co. mill at Franklin, Va., is discussed with the aid of illustrations. Emphasis is placed on the necessity for developing equipment which will take the heavy manual work out of wood production. Ideal equipment for unloading rail cars, not yet available, should be very mobile, fast, relatively inexpensive, and practical. There are definite advantages in the use of pallets. The discussion was originally part of a meeting of the Southern Technical Committee of the American Pulpwood Association. R.R.

WOOD TRANSPORTATION

McCOLL, B. J. The Magor side discharge pulpwood car. Pulp Paper Mag. Can. 50, no. 3: 278 (Convention, 1949).

Reference is made to a 50-ton rack car with an open top for hauling pulpwood, which is manufactured by the Magor Car Corp., of Passaic, N.J., and which has recently been put into service by the Bangor and Aroostock Railroad Co. Loading can be accomplished either mechanically or manually. The car is provided with hinged side panels on either side and can be tilted to an angle of approximately 45° for the discharge of the load to a skidway located beside drivable water. Approximately 16-24 cords can be carried in a car, depending upon the methods of loading used. The construction should be of interest to companies depending upon railroad transportation of their pulpwood supply. E.S.

X-RAY RESEARCH

KRATKY, O., and POROD, G. Diffuse small-angle scattering of x-rays in colloid systems. J. Colloid Sci. 4, no. 1: 35-70 (February, 1949).

Considering only coherent scattering, it is found that the general cause of diffuse small-angle scattering of x-rays is inhomogeneity of colloidal dimensions. Methods of calculation are reviewed. In densely packed systems it is observed that mutual interference of waves scattered by individual particles must be considered. Measurements of scattering of fibrous substances are interpreted in terms of micelle diameters. Small-angle scattering of regenerated cellulose from viscose is more intense than that of ramie. Minimum angle scattering is missing in viscose. These observations are explained in terms of (*a*) a greater fraction of total volume being occupied by interstices in case of viscose and (*b*) unlimited packing of lamellas of viscose. 35 references. A.M.B.

Patent Section

Although the abstracts of the United States patents are prepared from the patents themselves, the initial selection of the patents to be abstracted is made from the Patent Gazette *and, therefore, it is possible that the patent section will not contain all patents of potential interest to the industry. The abstracts of the Canadian patents are prepared from the claims published in the* Canadian Patent Office Record. *In so far as possible, an attempt will be made to indicate patents issued in both countries.*

The patent abstracts are listed under the various headings currently used for the abstracts of periodical articles.

Printed copies of United States patents can be obtained from the Commissioner of Patents, Washington, D.C.; the price is 25 cents per copy. Canadian patents are available only as manuscript or photostatic copies. They are furnished by the Commissioner of Patents, Ottawa, Canada. An estimate of the cost of a patent should be obtained in advance of the order.

ADHESIVES

CAESAR, GEORGE V., BAUER, JORDAN V., and HAWLEY, DON M. Waterproof adhesive and bonding process. U. S. patent 2,463,148. Filed June 17, 1943. Issued March 1, 1949. 2 claims. Assigned to Stein, Hall & Co., Inc.

The adhesive contains 15-85% by weight of total solids of ungelatinized starch (preferably about 50%), 5-50% of total solids of urea-formaldehyde condensation product (preferably about 25%), 5-75% of total solids of gelatinized starch (or an equivalent amount of other hydrosol-forming material) (preferably about 25%), and a ratio of water to solids within the range of about 4:1 to 1:1 (preferably 2 or 3:1). The pH of the product should be 5 to 6.5 (produced by the addition of an acid or acid salt). Various formulas and methods for their compounding are given. C.J.W.

PERRY, LLOYD M. Adhesive compositions. U. S. patent 2,462,029. Filed May 25, 1945. Issued Feb. 15, 1949; Canadian patent 455,364. Filed May 6, 1946. Issued March 22, 1949. 7 claims. Assigned to Nashua Gummed and Coated Paper Company.

An adhesive for labels, adhesive tapes, and the like consists of 45 parts indene resin, 10 parts ethylcellulose (20 centipoises), and 45 parts diphenyl phthalate. Ethyl alcohol, isopropyl acetate, and the like can be used as the solvent. The indene resin is a grade known as Nevindene R-3. Various other formulations are given. Paper (basis weight 24 × 36—500) is coated to yield a residual film of approximately 25 pounds per ream. The sheets are kept at room temperature for 48 hours to ensure evaporation of the solvent. The resulting products are nontacky under normal conditions of storage and handling but after activation will remain adhesive at room temperature or lower for a useful period of time. C.J.W.

ALKALINE PROCESSES—RECOVERY

ELY, FREDERIC G., and ROGERS, CHARLES E. Apparatus for the recovery of heat and chemicals from furnace gases. U. S. patent 2,463,757. Filed Oct. 16, 1942. Issued March 8, 1949. 3 claims. Assigned to The Babcock & Wilcox Company.

A spray tower construction is designed for the recovery of heat and chemicals from the waste gases of a chemical recovery furnace for kraft black liquors. Provision is made for an upflow of heating gases and a downflow of liquor to be concentrated with intimate contact between the two in the evaporating section of the spray tower and a downflow of both heating gases and liquor through a flow path in the chemical recovery or separating section of the tower, insuring efficient separation of the gases and liquor. Various details of the construction are described. C.J.W.

BARKERS AND BARKING

BENGTSSON, BENGT E. Barking spade. Canadian patent 454,906. Filed Nov. 4, 1947. Issued March 8, 1949. 1 claim.

The construction of a steel barking spade is claimed. C.J.W.

BUKOWSKY, HARRY E. Revolving high-velocity jet for hollow-head-type barker having low-pressure water supply. U. S. patent 2,463,084. Filed Feb. 6, 1945. Issued March 1, 1949. 9 claims. Assigned to Crown Zellerbach Corporation.

A hydraulic barker is described in which the water is delivered to the machine at low pressure and the necessary hydraulic jet velocity is developed in the machine itself. The debarking jet or plurality of jets directed against the log surface moves around the log in a plane normal to the direction of the travel of the log, thus causing the debarking to take place in a spiral path as the log passes through the barker. Provision is made for a pair of rotating ring assemblies, rotating in opposite directions and co-operating to produce a debarking jet. C.J.W.

SCHULERUD, REIDAR. Log barker. Canadian patent 454,929. Filed Nov. 4, 1947. Issued March 8, 1949. 3 claims.

A log barker consists of a water container and a water-tight drum adapted to be immersed into the water within the container to such a depth that the buoyancy of the drum balances the weight of the drum and the contents thereof. C.J.W.

BLEACHING—GROUNDWOOD

MCEWEN, ROBERT L. Treatment of ground wood pulp. U. S. patent 2,465,327. Filed Aug. 1, 1947. Issued March 22, 1949. 4 claims. Assigned to Buffalo Electro-Chemical Company, Inc.

This is equivalent to Canadian patent 448,268 (May 4, 1948); *cf.* B.I.P.C. 18: 721. C.J.W.

BOARD

CAMP, THOMAS P. Water-repellent coating composition and method of coating. U. S. patent 2,464,759. Filed March 30, 1945. Issued March 15, 1949. 3 claims. Assigned to United States Gypsum Company.

The coating composition consists of a mixture of one part of paraffin wax (melting from 122 to 165° F.) and from one to ten parts of asphalt (melting between 110 and 185° F.) in an aqueous emulsion. One use is in the manufacture of gypsum board. It cannot be used with cellulosic materials. C.J.W.

BOARD SPECIALTIES

NEBESAR, ROBERT J. Laminated tubular article. U. S. patent 2,465,257. Filed Sept. 12, 1945. Issued March 22, 1949. 2 claims. Assigned to Universal Moulded Products Corporation.

A method is described for forming a laminated tube from a plurality of sheets of paper which are united by a suitable adhesive. C.J.W.

ROSELIUS, LOUIS W. Partition for containers. U. S. patent 2,464,154. Filed Sept. 19, 1947. Issued March 8, 1949. 2 claims. Assigned to S & S Corrugated Paper Machinery Co., Inc.

Waved double-faced corrugated board is used as a partition to divide a container into two or more cushioned receptacles. A substantially semi-circular wave is preferred and two or more rows of the board are employed. C.J.W.

CELOTEX

NOLAN, ERNEST R., and DANBOM, EDWARD W. Shingle. U. S. patent 2,462,990. Filed Aug. 2, 1946. Issued March 1, 1949. 4 claims.

The shingle is manufactured from Celotex which is covered on one side and three edges with a sheet of metal, preferably aluminum or an aluminum alloy. Before the metal covering is put into position, the shingle is dipped in warm asphalt. C.J.W.

COOKING PROCESS

PORPHIRE, PIERRE. Process for producing unbleached cellulose for any purpose. Canadian patent 455,222. Filed March 20, 1945. Issued March 15, 1949. 17 claims. Assigned to Société Française de la Cellulose, Société Anonyme.

Annual plants are heated in an autoclave with a solution containing from 10 to 100 grams of an alkaline chloride (e.g., sodium chloride or sea water) at 100 to 200° C., the time depending on the type of material being treated, and are then heated for 2 to 8 hours at 135 to 155° C. with a solution containing from 10 to 40 grams of sodium hydroxide per liter which is prepared by electrolysis and therefore contains some sodium chloride. The crude pulp can be bleached with chlorine, followed by sodium hypochlorite. C.J.W.

DISINFECTION AND DISINFECTANTS

SCHUTTEN, JOSEPH J. Paper currency disinfector. U. S. patent 2,463,208. Filed Aug. 5, 1947. Issued March 1, 1949. 5 claims.

An apparatus is described by which a disinfectant is applied to both sides of paper currency by means of a perforated roller. C.J.W.

DISPENSING CONTAINERS

GLUCK, FRED C. Dispensing carton for paper rolls. U. S. patent 2,463,375. Filed May 25, 1945. Issued March 1, 1949. 3 claims. Assigned to Minerva Wax Paper Company.

A dispensing carton for waxed paper or other sheet material in a roll is described. C.J.W.

FOLDING BOXES

LAMBERT, RUSSEL A. Carton and blank therefor. Canadian patent 454,767. Filed Nov. 23, 1946. Issued March 1, 1949. 3 claims.

The construction of a folding box is claimed. C.J.W.

MORRIS, JAMES C. Handle reinforcing means for containers. U. S. patent 2,464,337. Filed Aug. 12, 1944. Issued March 15, 1949. 5 claims. Assigned to The Ohio Boxboard Company.

Staples or stitches, preferably of metal strip or ribbon, are applied to the container blanks while in flat form and are so located as to span the outer surfaces of the score or fold lines; when the container is set up for use, these form the top edges of the side walls to which the handle ends are applied. C.J.W.

O'CONNOR, RICHARD P. Display box. U. S. patent 2,465,169. Filed Dec. 13, 1948. Issued March 22, 1949. 6 claims.

A display box is described which can be formed readily into a picture frame configuration. The box has sloping inner side and end walls which are held in proper relation by a portion of the box which is capable of holding one or more articles. C.J.W.

STENGREN, JON. Display box. U. S. patent 2,464,951. Filed Dec. 14, 1945. Issued March 22, 1949. 4 claims. Assigned to Edward McSweeney.

A box is designed for the display of jewelry in retail stores. C.J.W.

TOMARIN, HARRY A. Folding box. U. S. patent 2,464,904. Filed April 15, 1947. Issued March 22, 1949. 5 claims.

A folding box is described which is suitable for packaging clothing for transport from the store to the home; it includes an integrally formed cover member which is provided with means for releasably engaging the body portion of the box to prevent accidental opening of the cover member. C.J.W.

WALLER, PAUL H. Foldable box or carton and blank therefor. Canadian patent 454,933. Filed Jan. 9, 1947. Issued March 8, 1949. 9 claims.

A blank for a carton consists of three main panels adapted to be folded to form the bottom, a raised display platform, and the cover. C.J.W.

ZINN, JULIUS A., JR. Carton. U. S. patent 2,464,065. Filed March 19, 1947. Issued March 8, 1949. 15 claims.

The construction of a lined carton is described. It is adapted to hold fine grain or liquid material. C.J.W.

FURFURAL

SEVÓN, JOHAN W. Process for the production of furfural. U. S. patent 2,463,000. Filed April 12, 1946. Issued March 1, 1949. 4 claims.

Fermented sulfite waste liquor, freed from alcohol by distillation, is acidified, heated in an autoclave at 150-180° C., and distilled to recover the furfural. C.J.W.

LIGNIN

POLLAK, ARTHUR, KEILEN, JOHN J., JR., and DRUM, LEWIS F. Method of producing lignin from black liquor. U. S. patent 2,464,828. Filed Feb. 22, 1944. Issued March 22, 1949. 3 claims. Assigned to West Virginia Pulp and Paper Company.

Black liquor is evaporated to 20-30% solids, the soaps are removed by skimming, and the skimmed liquors are carbonated at about 170° F. until the pH is about 9, during which the temperature drops to about 120° F. The carbonated product is heated to 160-200° F. to produce a readily filterable lignin. C.J.W.

MACHINERY—CONSISTENCY REGULATORS

THORP, CLARK E., and ANDERSON, LOUIS E. Consistency control. Canadian patent 454,848. Filed Oct. 2, 1947. Issued March 1, 1949. 9 claims. Assigned to Hawley Products Company.

A photoelectric method is described for controlling the consistency of pulp suspensions having not more than 1% of solid material; it is used in connection with a pulp molding operation. C.J.W.

MACHINERY—CONVERTING MACHINERY

LEVKOFF, DAVID. Folding box setup machine. U. S. patent 2,464,407. Filed Nov. 26, 1945. Issued March 15, 1949. 6 claims.

A machine is described for automatically setting up a collapsed box. C.J.W.

MILLER, KAY. Machine and method for making paper-wrapped pencils. Canadian patent 454,989. Filed Nov. 13, 1947. Issued March 8, 1949. 9 claims. Assigned to Joseph Dixon Crucible Company.

This corresponds to U. S. patent 2,259,959 (Oct. 21, 1941) and relates to a machine for winding successive, alternate coils of paper and glue around an elongated core to form a pencil. C.J.W.

MILLER, KAY. Machine for preparing newsprint paper for use as pencil sheaths. Canadian patent 454,991. Filed Nov. 13, 1947. Issued March 8, 1949. 4 claims. Assigned to Joseph Dixon Crucible Company.

This corresponds to U. S. patent 2,375,676 (May 8, 1945) and relates to a mechanism for heating a paper strip to render it suitable for use in the manufacture of paper-covered pencils. C.J.W.

SHUMANN, HAROLD F. Apparatus for making bags. U. S. patent 2,465,044. Filed June 6, 1945. Issued March 22, 1949. 1 claim.

An apparatus is described by means of which a single web of bag-forming material can be used to produce a plurality of continuous tubes from which bag or tube lengths can be severed. C.J.W.

MACHINERY—CREPING MACHINE

STEPHENSON, CHESTER E. Device for stretching, crimping, and twisting crepe paper. U. S. patent 2,464,657. Filed Oct. 16, 1947. Issued March 15, 1949. 3 claims.

The apparatus consists of a U-shaped roll or shaft on which one end of the crepe paper is rolled to stretch the paper and by means of which the paper can be twisted into the desired shape or design. C.J.W.

MACHINERY—HEAD BOX

GOLDSMITH, PHILIP H. Flow spreader. U. S. patent 2,465,445. Filed Feb. 3, 1945. Issued March 29, 1949. 19 claims.

This is equivalent to Canadian patent 450,504; *cf.* B.I.P.C. 19: 63. C.J.W.

SMITH, DREXEL V., and MILES, GEORGE W. Paper making machine. Canadian patent 454,756. Filed April 21, 1947. Issued March 1, 1949. 7 claims.

This patent relates to the construction of a headbox, a pulp outlet spout, top and bottom slices, and methods for supporting and actuating them. C.J.W.

MACHINERY—SCREENS

JÖNSSON, NILS W. Apparatus for screening fibrous suspensions. U. S. patent 2,464,581. Filed May 3, 1945. Issued March 15, 1949. 1 claim.

The pulp suspension is passed through an upright screening mechanism rotated around a vertical axis, the screening mechanism being set in vibratory motion in vibration planes perpendicular to the axis of rotation. C.J.W.

ORTON, SAMUEL T., JR. Wood pulp screening vat. Canadian patent 455,073. Filed July 21, 1947. Issued March 8, 1949. 5 claims. Assigned to Union Machine Company.

The construction of a wood-pulp screening vat is claimed. C.J.W.

MACHINERY—THICKENERS

SKINNER, HAROLD A. Dewatering apparatus. U. S. patent 2,463,814. Filed Nov. 7, 1944. Issued March 8, 1949. 4 claims. Assigned to Marathon Corporation.

Low consistency stock is allowed to flow through an inclined pipe (at an angle of about 45°), a portion of which is equipped with a wire mesh screen to permit removal of the water. About 50% of the water can be removed from the stock in this manner. C.J.W.

NITRIC ACID PROCESS

MAINGUET, HENRI. Extraction of cellulose from fibrous and vegetable matters. Canadian patent 454,923. Filed Aug. 20, 1945. Issued March 8, 1949. 10 claims.

A fibrous material is impregnated, at a temperature below 50° C., with sufficient nitric acid to attack the incrusting material, the impregnated material is heated at a temperature above 50° for not over half an hour under atmospheric pressure, and then boiled with 2% sodium hydroxide for less than half an hour. C.J.W.

PAPER—COATED

DILLEHAY, EDWARD R. Rubber coated resin saturated sheet and process of making the same. U. S. patent 2,464,783. Filed Feb. 28, 1945. Issued March 22, 1949. 3 claims. Assigned to The Richardson Company.

The material to be impregnated is stated to be a thin fiber-glass woven sheet or unbleached print cloth; the principle might be applied to paper. The sheet is saturated with a phenol resin which will cure at 300° F. and 1000 p.s.i. in 10 minutes. The saturated sheet is sprayed with a rubber cement (neoprene or a mixture with a furfuryl resin) and the composite is cured under the above conditions. C.J.W.

LUÁCES, ENRIQUE L. Wrinkle coating composition. U. S. patent 2,465,243. Filed Nov. 3, 1945. Issued March 22, 1949. 1 claim. Assigned to New Wrinkle, Inc.; *cf.* Beynon, B.I.P.C. 19: 519-20.

A wrinkle-coating composition consists of a resin resulting from the reaction at 400° F. of 60 parts of glycerol, 120 parts of phthalic anhydride, and 102 parts of fatty acids. The fatty acids are obtained by saponification of cottonseed, corn, or peanut oil. C.J.W.

PAPER SPECIALTIES

CARTER, EDWARD J. Method of making adhesive tape. U. S. patent 2,463,244. Filed Aug. 7, 1947. Issued March 1, 1949. 3 claims. Assigned to William M. Scholl.

An adhesive tape is formed by distributing a solution of a film-forming resin over a casting web, superimposing a paper web over the resin layer, compressing the composite to force the solution through the paper web to impregnate the latter, evaporating the solvent to form a resin film having the paper embedded therein, spreading a solution of a pressure-sensitive resin over one side of the fiber-reinforced resin film, superimposing a paper web over the adhesive solution, again compressing the product and evaporating the solvent to form a layer of pressure-sensitive adhesive on the resin film with the paper embedded in the adhesive layer, and stripping the casting web from the resin film. The resin may be cellulose esters or ethers, nylon, polyvinyl alcohol and its derivatives, polystyrene, or polymerized methyl methacrylate. The pressure-sensitive adhesive may be a rubber combined with rosin or other suitable material. C.J.W.

DAVIES, HERBERT V. Continuous envelope assemblies. U. S. patent 2,464,490. Filed Sept. 15, 1944. Issued March 15, 1949. 2 claims.

An envelope assembly is formed from a single blank, the flap portion of each envelope being integral with the back portion of the immediately preceding envelope of the series; it is adapted to be fed in a continuous strip form through a typewriter, an addressing machine, or the like. C.J.W.

FOOTE, CHAUNCY P., JR., and GUERTIN, CLIFFORD D. Protectively coated paper and method of making same. Canadian patent 455,135. Filed Dec. 13, 1945. Issued March 15, 1949. 15 claims. Assigned to American Bank Note Company.

In the manufacture of a safety paper, in which the characters become illegible on immersion in water, one side of the paper is coated with a composition consisting of a water-soluble binder and an organic acid from the group including tartaric, citric, and lactic acids, drying this coating, and then coating at least one side of the paper with a composition containing a water-soluble binder and an alkaline earth carbonate (e.g., calcium carbonate). The written or printed characters are applied to the side of the sheet carrying the carbonate coating. C.J.W.

FOURNESS, CHARLES A. Sanitary napkin. U. S. patent 2,464,640. Filed May 25, 1945. Issued March 15, 1949. 5 claims. Assigned to International Cellucotton Products Company.

A sanitary napkin embodies an elongated absorbent pad and a pervious wrapper enclosing the same, the pad comprising a layer of relatively superposed plies of creped tissue paper on the body face of the pad and a layer of fluff underlying the tissue layer. C.J.W.

GROUSE, RICHARD A. Process for the treatment of metallized paper and the manufacture of electric condensers therefrom. Canadian patent 455,096. Filed Jan. 23, 1947. Issued March 8, 1949. 10 claims. Assigned to A. H. Hunt Limited.

This is a reissue of Canadian patent 431,245 (Nov. 13, 1945); *cf.* U. S. patent 2,435,441 (Feb. 3, 1948); B.I.P.C. 18: 488. C.J.W.

HESSELROTH, CHARLES F. Composite flexible moistureproof wrapping tape or sheet. Canadian patent 455,363. Filed Nov. 13, 1947. Issued March 22, 1949. 2 claims. Assigned to Minnesota Mining and Manufacturing Company.

This corresponds to U. S. patent 2,444,443 (July 6, 1948); *cf.* B.I.P.C. 19: 66. C.J.W.

MILLER, KAY. Method of preparing newsprint paper for use as pencil sheaths. Canadian patent 454,990. Filed Nov. 13, 1947. Issued March 8, 1949. 5 claims. Assigned to Joseph Dixon Crucible Company.

This corresponds to U. S. patent 2,352,444 (June 27, 1944); a strip of unaged unprinted newsprint is subjected for 0.11 to 3 minutes to a temperature varying from 200 to 345° C., there being a direct relation between the time and temperature. C.J.W.

MOORE, GEORGE A. Bag for merchandising. U. S. patent 2,463,992. Filed March 16, 1946. Issued March 8, 1949. 8 claims. Assigned to Reynolds Metals Company.

A semirigid bag is formed of a cradle of a metal foil laminated to a paper sheet and a bag of the gusset type formed of heat-sealing cellophane or Pliofilm. The closure of the cradle provides a means for hermetically sealing the mouth of the bag after filling. C.J.W.

ORCHARD, HERMAN C. Satchel bag having reinforced side walls and handle. U. S. patent 2,463,302. Filed May 21, 1945. Issued March 1, 1949. 4 claims. Assigned to Orchard Paper Company.

The seamed and the unseamed panels of a satchel bag are so reinforced that the strip on the unseamed panel will be sufficiently heavier or stronger than the corresponding reinforcing strip along the seamed panel that the resultant strength along the median width of both panels will be approximately equal. The bag can have registering apertures through the reinforced panels and tongues struck out of the panels to provide a carrying means. C.J.W.

REESE, THOMAS S. Decalcomania. Canadian patent 455,175. Filed May 15, 1947. Issued March 15, 1949. 8 claims. Assigned to The Di-Noc Company.

A transfer composition consists of a water-permeable backing sheet, a coating of starch on the backing sheet having a mat surface, and a transfer film composed of a material insoluble in water releasably secured to the backing sheet by the coating and having a mat surface in contact with the coating. C.J.W.

YULE, GEORGE W. Adhesive compositions and adhesive sheets. U. S. patent 2,463,452. Filed Aug. 7, 1943. Issued March 1, 1949. 4 claims. Assigned to E. I. du Pont de Nemours & Company.

A removable adhesive sheet (masking paper) has a tacky coating consisting essentially of 30-97% of polyisobutylene (molecular weight of 80,000 to 110,000), 3-10% of dibutyl sebacate as an anti-adhesive transfer agent, and up to 60% of a mineral oil as an extender. Various formulations are given. C.J.W.

PHYSICAL TESTING—PAPER—STIFFNESS

TABER, RALPH F. Apparatus for measuring the stiffness of flexible materials. U. S. patent 2,465,180. Filed Dec. 8, 1945. Issued March 22, 1949. 10 claims.

This is an improved stiffness tester previously disclosed in U. S. patents 2,063,275 (Dec. 8, 1936) and 2,113,389 (April 5, 1938). C.J.W.

PHYSICAL TESTING—PULP—FREENESS

QVEFLANDER, THOR G. Contrivance for determining the degree of beating of fibre mass suspensions. Canadian patent 454,938. Filed Jan. 24, 1947. Issued March 8, 1949. 13 claims. Assigned to A. Ahlström Osakeyhtiö.

A method is described for measuring the quantity of water which is separated from a fibrous suspension by means of a filter cloth. C.J.W.

PIGMENTS

RAFTON, HAROLD R. Machine and method for treating material. Canadian patent 455,215. Filed March 4, 1944. Issued March 15, 1949. 3 claims. Assigned to Rafton Engineering Corporation.

This corresponds to U. S. patent 2,448,049 (*cf.* B.I.P.C. 19: 137) and relates to a machine for impacting pigments against a rotating disk element. C.J.W.

PLASTICS—PAPER-BASE

DICKERMAN, GILBERT K. Production of laminated plastic. U. S. patent 2,463,856. Filed March 22, 1943. Issued March 8, 1949. 3

claims. Assigned to Consolidated Water Power and Paper Company.

A relatively thin, porous, absorbent sheet of Mitscherlich sulfite paper is supercalendered to densify it and reduce the voids content and impregnated with a phenolic resin in alcoholic solution to give a resin content of 26-32% (on the weight of the dry paper); a plurality of plies is subjected to heat and pressure (not in excess of 250 p.s.i.) to cure the resin and to reduce the voids content of the mass to less than about 6%. The product is suitable for the manufacture of aircraft parts. C.J.W.

WACHTER, JOSEPH J. Laminated product embodying a low odor phenol-formaldehyde resin. U. S. patent 2,465,299. Filed Jan. 1, 1945. Issued March 22, 1949. 5 claims. Assigned to Westinghouse Electric Corporation.

A phenol-formaldehyde resin with practically no odor can be produced by the condensation of phenol and formaldehyde in the presence of an alkyl amine; on the basis of the phenol, the following percentages are used: 0.45-0.55% ethylenediamine, 1.15-1.35% hexamethylenetetramine, 0.7-0.8% dimethylamine, 0.9-1.1% methylamine, or 1.4-1.6% ethylamine. The mixture is refluxed about 120 minutes. The product is suitable for use with various types of paper. C.J.W.

ROOFING FELTS

QUINN, ROBERT G. Felted sheet and method of manufacture. Canadian patent 455,029. Filed Nov. 19, 1945. Issued March 8, 1949. 6 claims. Assigned to Johns-Manville Corporation.

A pliable roofing felt which resists substantial increase of caliper during impregnation with hot asphalt consists of 35-60% mechanically fiberized steam-softened softwood fibers, 30-40% fiberized waste paper, and 0-25% mechanically fiberized rag fiber, the felt having a bulk index of 1-1.3, a kerosene absorption of about 150%, and sufficient pliability for bending around a 0.5-0.75-inch mandrel without cracking. C.J.W.

SETUP BOXES

WILSON, ALLEN B. Container and method of making same. U. S. patent 2,464,278. Filed April 2, 1945. Issued March 15, 1949. 6 claims. Assigned to Kimberly Stuart and Elizabeth R. B. Stuart.

A container structure embodies a foldable or otherwise normally collapsible body member and separate reinforced end-closure members which, when assembled with the body member, maintain the latter in the form desired for use, reinforce it against collapse, and prevent injury from abrasive and impact forces. C.J.W.

SHIPPING CONTAINERS

BROWN, BRADFORD W. Carton. Canadian patent 454,852. Filed April 8, 1947. Issued March 1, 1949. 19 claims. Assigned to Hummel and Downing Company.

A telescoping carton is claimed. C.J.W.

DE MIAN, STANLEY B. Fiberboard shipping container. U. S. patent 2,465,324. Filed July 24, 1944. Issued March 22, 1949. 3 claims.

In a shipping container, flaps extend from predetermined positions of the side- and end-wall sections. Each of the flaps is predeformed along spaced parallel lines at the upper edge of its respective wall section and is bent along such lines and folded inwardly to form a double wall section with an upper channel-shaped cross section, thus providing a rim of substantial area along the upper periphery of the box. The term predeformed means a scoring, creasing, or partial cutting of the flaps to facilitate their bending along the predeformed line. C.J.W.

GUYER, REYNOLDS. Paper can body. U. S. patent 2,464,131. Filed July 25, 1945. Issued March 8, 1949. 5 claims. Assigned to Waldorf Paper Products Company.

Cylindrical can bodies are formed by bending a plurality of flat sheets into tubular formation with one sheet overlying the other. The butt edges of the various laminations are in angularly spaced relationship. The sheets are coated with a thermoplastic material so that they can be adhered together by the application of heat and pressure. C.J.W.

POTTS, ROY C. Carton securing means and method of using same. U. S. patent 2,463,306. Filed April 26, 1944. Issued March 1, 1949. 9 claims.

A container is provided with a plurality of perforations in the closure flaps, into which are inserted wire closing devices. A handle member can be applied to the wires. C.J.W.

RINGLER, WILLIAM A. Container. U. S. patent 2,463,313. Filed May 4, 1945. Issued March 1, 1949. 5 claims. Assigned to Gardner-Richardson Company.

A method is claimed for sealing a container which consists of an outer carton having enclosing walls and end-closure flaps and an inner heat-sealable member. The inner member is folded or flattened and sandwiched between end flaps of the outer carton, after which heat and pressure are applied to the outside of the folded end flaps. C.J.W.

ROBINSON, JOSEPH, JR. Crated sheet material package. U. S. patent 2,464,153. Filed Sept. 12, 1945. Issued March 8, 1949. 2 claims. Assigned to Marsh Wall Products, Inc.

Wall boards and similar sheets are packed in a crate comprising metal channel-shaped side members and wooden end members attached at their ends to the adjacent ends of the channel side members; the wood end members have channel-shaped clips attached thereto for embracing the ends of the pile or bundle of the boards. The side members have portions of their outer corners cut away at spaced intervals to accommodate metal bands or straps and thus protect them against abrasion. C.J.W.

SHIPPING CONTAINERS—MULTIWALL BAGS

YOUNT, STANLEY G. Method and apparatus for forming paper bags. Canadian patent 455,282. Filed Oct. 16, 1946. Issued March 22, 1949. 8 claims.

An apparatus and method are described for forming multiple-walled gusset tubes for paper bags from a plurality of rolls of paper of substantially the same width. C.J.W.

STARCH

HANSEN, DONALD W., GILL, LOWELL O., and WRIGHTSMAN, JOHN H. Modification of starch. U. S. patent 2,464,081. Filed March 8, 1946. Issued March 8, 1949. 11 claims. Assigned to A. E. Staley Manufacturing Co.

Powdered starch is mixed with water to raise its moisture content to about 28%, passed through 6-inch rolls heated to about 70° F. which are spaced about 0.012 inch apart and are rotated in opposite directions; one roll rotates at a peripheral speed of 45 and the other at 36 ft./min. The product is then dried to a moisture content of about 12% in a current of air at about 140° F. and ground to pass a 65 mesh screen. The treated starch dispersed in 10 parts of cold water to such an extent that 75% of the dry substance of the dispersion passed through a No. 17 bolting silk. The viscosity of a dispersion of 30 parts of the product in 250 parts of cold water was 29° MacMichael as compared with 2° M. for the original starch. Various examples are given to illustrate variations in the conditions which can be used. C.J.W.

SULFITE WASTE LIQUOR

MCFARLANE, WILLIAM D., and NIKOLAICZUK, NIKOLAI. Process of treating chick-hatchery waste to recover protein-fat concentrate. Canadian patent 454,875. Filed March 16, 1945. Issued March 1, 1949. 6 claims. Assigned to The Ogilvie Flour Mills Co. Limited.

This is similar to U. S. patent 2,418,311 (April 1, 1947); chick hatchery waste is treated with lignin or lignosulfonic acid and heated, the product representing a protein-fat concentrate. C.J.W.

REICH, GUSTAVE T. Treating fermentable materials. U. S. patent 2,464,611. Filed March 27, 1945. Issued March 15, 1949. 7 claims.

Liquid materials containing calcium compounds and fermentable organic compounds (e.g., molasses, sulfite waste liquor, fruit juices, and the like) are heated to a temperature above 160° F. but below the boiling point in the presence of a precipitant for calcium (e.g., sulfuric acid) at a pH of 3 to 5, the precipitate is separated (preferably after concentration), the filtrate is adjusted to a pH of 5.5 to 6.5 by the addition of an alkaline compound (e.g., sodium carbonate), and the evaporation is continued to the desired concentration. C.J.W.

TEXTILE INDUSTRY AND FABRICS—FIREPROOFING

LEATHERMAN, EARL W. Flameproofing composition. U. S. patent 2,463,983. Filed Sept. 16, 1943. Issued March 8, 1949. 7 claims.

Various formulas are given for a flameproofing agent. These are based on a thermally unstable chlorinated resinous material, a dechlorinating agent, and an inhibiting compound for prevention of the dechlorination of the resin at temperatures below 100° C. A typical formula is: zinc hydroxide or oxide 10-20 parts (or a mixture of these), a chlorinated paraffin wax (40-60% chlorine) 15-25 parts, oleic acid 2-10 parts, colored or white pigment 15-20 parts, and solvent to thin as desired. C.J.W.

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